# THE
# RADIOLOGICAL DETERMINATION
# OF THE
# PLACENTAL SITE

III

A THESIS
submitted for
the Degree of
DOCTOR OF MEDICINE
of the
UNIVERSITY OF LIVERPOOL

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1952

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## ACKNOWLEDGEMENTS

The work embodied in this thesis has been carried out at Mill Road Maternity Hospital, Liverpool in 1949-50-51-52, during my appointments as Senior Registrar in Radiology and latterly as Assistant Radiologist.

I would like to express my gratitude to all of the Consultant and Resident Obstetrical Staff for their clinical co-operation which made the work possible.

Mr. W. Jennings, Superintendent Radiographer, and the Staff of the X-ray Department have shown endless patience in carrying out, amongst the other work in a busy general X-ray Department, the various modifications in radiographic technique demanded by this study. I owe them my best thanks.

Mr. D. Walsh reproduced the radiographs for me, without retouching them in any way, employing a new technique in order to preserve as much detail as possible.

# CHAPTER 1

## INTRODUCTION

This thesis describes the various techniques essayed and those finally adopted for the radiological determination of the placental site. The relevant literature is critically reviewed, and methods and results of other workers are compared with those of the present investigation.

In particular the diagnosis of placenta praevia by radiological means is discussed, and the results obtained are compared with the clinical findings.

The effect of the placental site on the presentation of the foetus is shown, and the relationship of the foetal surfaces to the site is noted.

The material consisted of 424 pregnant women who were examined radiologically at Mill Road Maternity Hospital between January 1949 and March 1952.

### Historical.

The radiological location of the placental site was first reported in 1930 by Menees, Miller and Holly who employed the technique of amniography for this purpose. In succeeding years the clinical problem of the diagnosis of placenta praevia stimulated many further attempts to locate the placental site by radiological methods.

These methods may be classified as follows:-

(A) Indirect Placentography.

Cystography.

(B) Direct Placentography.

i) Amniography.

ii) Use of Selective Opaque Media.

iii) Aortography.

iv) Use of Radio-active Isotopes.

v) Injection of Vessels of the Umbilical Cord.

vi) Soft Tissue Radiography.

Each of these methods will be considered in turn.

# CHAPTER 2

## INDIRECT PLACENTOGRAPHY

## CYSTOGRAPHIC METHODS

The observation that in the condition of placenta praevia, the presenting part might be displaced from the urinary bladder and thus provide a radiological sign of placenta praevia, was first made by Ude, Weum and Urner in 1934.

In viewing a direct radiograph of a pregnant woman, they recognised that a soft tissue mass was interposed between the presenting foetal head and the partially filled bladder. They suggested a diagnosis of placenta praevia, and this was subsequently confirmed at Caesarean section.

This led them to visualize the bladder by filling it with a solution of sodium iodide, in order to assist in diagnosis in two further cases. By this method they were able to define clearly the bladder and to measure its distance from the presenting part.

The argument was that in a normal "foetal head - urinary bladder" relationship where the placenta is not implanted in the lower uterine segment, the distance from the foetal head to the urinary bladder would not exceed a few millimetres - the combined thickness of foetal scalp, lower uterine segment, peritoneal reflection and bladder wall. In placenta praevia the distance would be increased because of the intervention of the thickness of the placenta.

With this basic principle a number of techniques were evolved, employing a variety of media and with different criteria as to the normal range of "head - bladder" relationship.

(1) Pneumocystography.

Snow and Rosensohn (1939), Prentiss and Tucker (1939), Sohrne (1942) and McCort, Davidson and Walton (1944) used air as the contrast medium in the bladder. Air was preferred because of the translucency it produced, rather than the opaque shadow of other contrast media, which tended to obscure the relevant soft tissue shadows in the pelvis.

(2) Cystography with Opaque Media.

In this technique a solution of sodium iodide has almost invariably been employed, but there has been considerable diversity of opinion as to the optimum quantity of the solution needed in the bladder.

Thus Ude and Urner in 1935 used a small quantity of media, 25-40 ml. of a 12½ per cent. solution of sodium iodide, and a similar technique was employed by Ude, Urner and Robbins, and Beck and Light in 1938. Carvalho in 1940, Stander in 1942 and Sala and Bergolt in 1942 also advocated small quantities. On the other hand larger quantities of opaque media were preferred by Bjerre in 1940, Buxton, Hunt and Potter in 1942 and Bishop in 1945.

A cystographic technique was also employed by Jablonski and Meisels in 1935, McIver in 1936-7, McDowell in 1937, Hall, Currin and Lynch in 1937 and Williams in 1938.

Originally the method was confined to taking radiographs in the supine position, but in 1940 Bjerre advocated examination with the woman erect. His findings together with those of Williams in 1938, who had also used the erect position, show that this modification reduces

the number of errors obtained when only supine radiographs are used.

More recently, following the origination of the soft tissue technique for location of the placenta by Snow and Powell in 1934, this method was combined with cystography for the diagnosis of placenta praevia. Radiographs obtained by both methods were studied and the findings from each co-related. This combination has been used by Snow and Rosensohn in 1939, Buxton, Hunt and Potter in 1942, McCort, Davidson and Walton in 1944 and Stevenson in 1949.

Value of the Cystographic Method.

With all these techniques the diagnosis of placenta praevia is based on the distance from the outline of the bladder to the presenting foetal part, most commonly the head, but there has been no general agreement on the normal distance between these points, in the absence of placenta praevia. Opinions have varied within the limits 6 - 8 mm. advocated by Williams in 1938 to 2.2 cms. given by Prentiss and Tucker in 1939.

Further as diagnosis by the cystographic method was dependant on interposition of the placenta between the foetal head and the urinary bladder, posterior placenta praevia would anatomically not be a displacing factor, unless of such a degree that, covering the os uteri, it extended forwards between the head and the bladder, or favoured high position of the presenting head.

Examination of published errors, especially those of Carvalho in 1940, support this, since many of these occurred in posterior placenta praevia.

Sohrne in 1942 attempted to overcome this limiting factor. He advocated inflating the rectum with air, so as to demonstrate a similar head - rectum relationship, which could be used to demonstrate posterior placenta praevia.

Altogether review of the results of the method shows a considerable margin of error. Carvalho in 1940 recorded that in 19 cases of placenta praevia, six had shown a normal head- bladder relationship, and thus an erroneous diagnosis had been made. McCort, Davidson and Walton in 1944 recorded five similar errors, Beck and Light in 1938 four errors and Dannenberg, Beilly, Rodney and Storch in 1950 17 errors.

The cystographic method presents therefore the following disadvantages:-

1). It is applicable, according to the majority of authors, only to vertex presentations.

2). It is of little value in posterior placenta praevia.

3). Its results show a considerable margin of error.

4). It provides only indirect evidence of the location of the placental site, to either the upper or lower uterine segments.

5). It involves instrumentation of the patient.

For these reasons and especially because the site of the placenta is not determined with sufficient accuracy the method was not employed for this series. Comparison of results shows that for the diagnosis of placenta praevia the soft tissue method provides a greater degree of accuracy.

# CHAPTER 3

## DIRECT PLACENTOGRAPHY

(1). Amniography.

This method of locating the placental site was introduced by Menees, Miller and Holly in 1930. It entails the injection of an opaque medium directly into the amniotic sac through the anterior abdominal and uterine walls. The injected medium mixes with the liquor amnii, raising its relative opacity to x-rays above that of the surrounding structures. Thus, on a radiograph, the amniotic sac is outlined and various filling defects are produced by the foetal parts, the placenta and the umbilical cord. Ready and exact delineation of the placental site is thus achieved.

Menees and his colleagues used a solution of strontium iodide which whilst satisfactory radiographically was dangerous in two respects: it was toxic to both mother and foetus, and it precipitated the onset of labour. In order to avoid these disadvantages other compounds were substituted. Adair and Davis in 1933 used Skiodan (Abrodil) and Burke in 1935 used Uroselectan B. These solutions proved much less toxic but still precipitated labour in 2 - 72 hours (Burke).

Other complications were also reported after amniography, including the introduction of infection, injury to the foetus, damage to the umbilical vessels, separation of the placenta and unexplained foetal death. Because of

these hazards amniography was never widely adopted although its value was confirmed by many workers (Adair and Davis, 1933; Kerr and Mackay, 1933; Cornell and Case, 1934; and Burke, 1935).

During the present investigation amniography was employed twelve times. The medium injected was 20-30 ml. of a solution of "diodone" (70% Vasiodone). With this medium the onset of labour was not precipitated; in one case indeed labour did not commence until five weeks after amniography.

The following conclusions were drawn from this small series of cases and from a review of the literature. There are certain disadvantages:-

1). It is a surgical procedure with attendant risks to both mother and foetus.

In one case in the present series a small quantity of the medium was injected directly into the foetal arm. This perforation of the foetus, which was born alive, produced a small area of necrosis at the site of the injection. The area subsequently healed.

In a second case the medium was injected directly into a maternal placental sinus or vessel. A pyelogram of the mother was obtained, but no subsequent ill-effects, in either mother or child, developed.

In a third case a small quantity of the medium was injected directly into the substance of the placenta, and the patient was subsequently delivered of a stillborn foetus. No obvious cause for the foetal death was demonstrated.

These three complications occurred when the placenta was located on the anterior uterine wall.

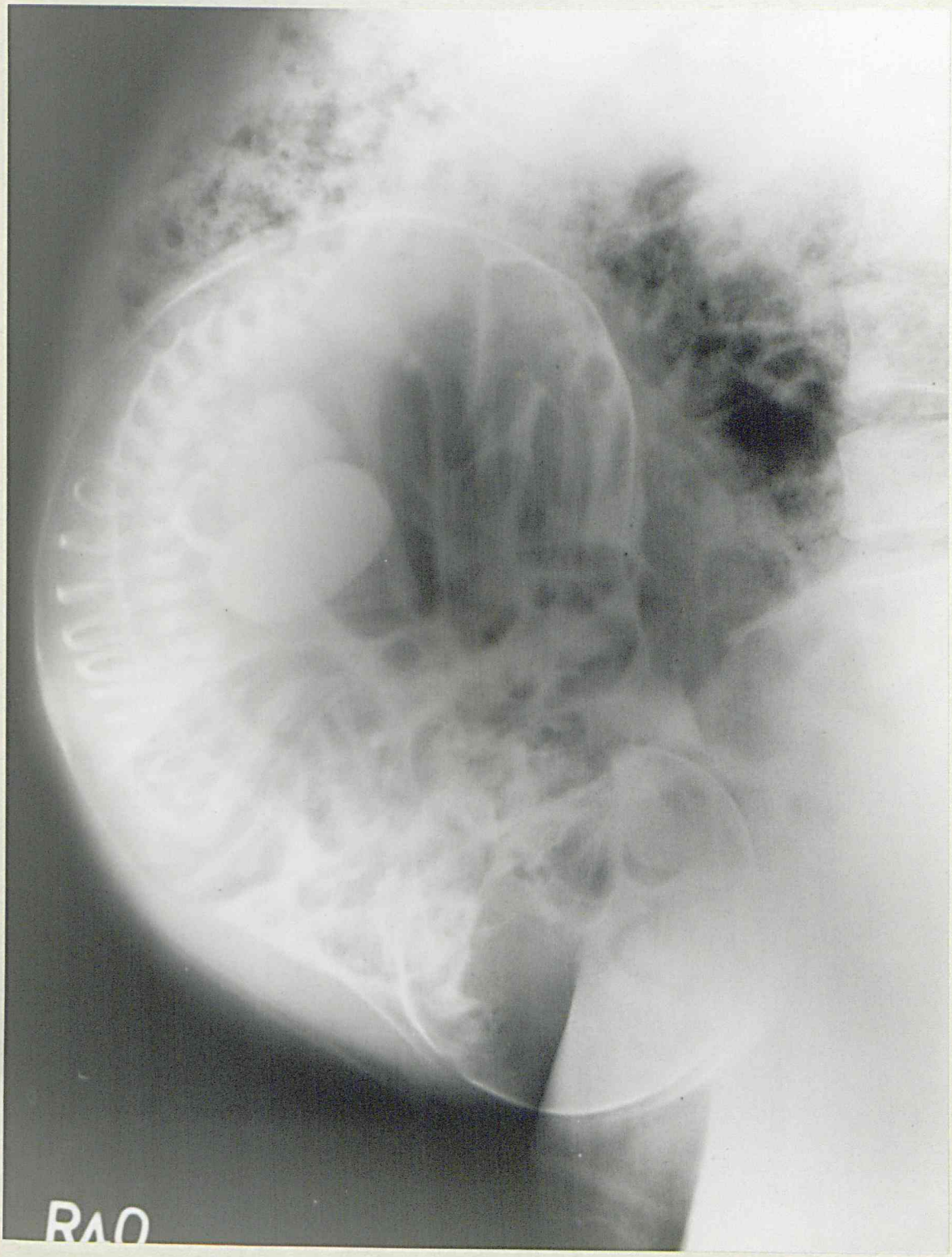



Figure 1. Amniography using 30 ml. of 70% Vasiodone. The lateral radiograph of the abdomen demonstrates a posterior placenta praevia, the placenta being low down on the posterior uterine wall. Foetal stomach and proximal small bowel outlined by the opaque medium (Case No. 252).

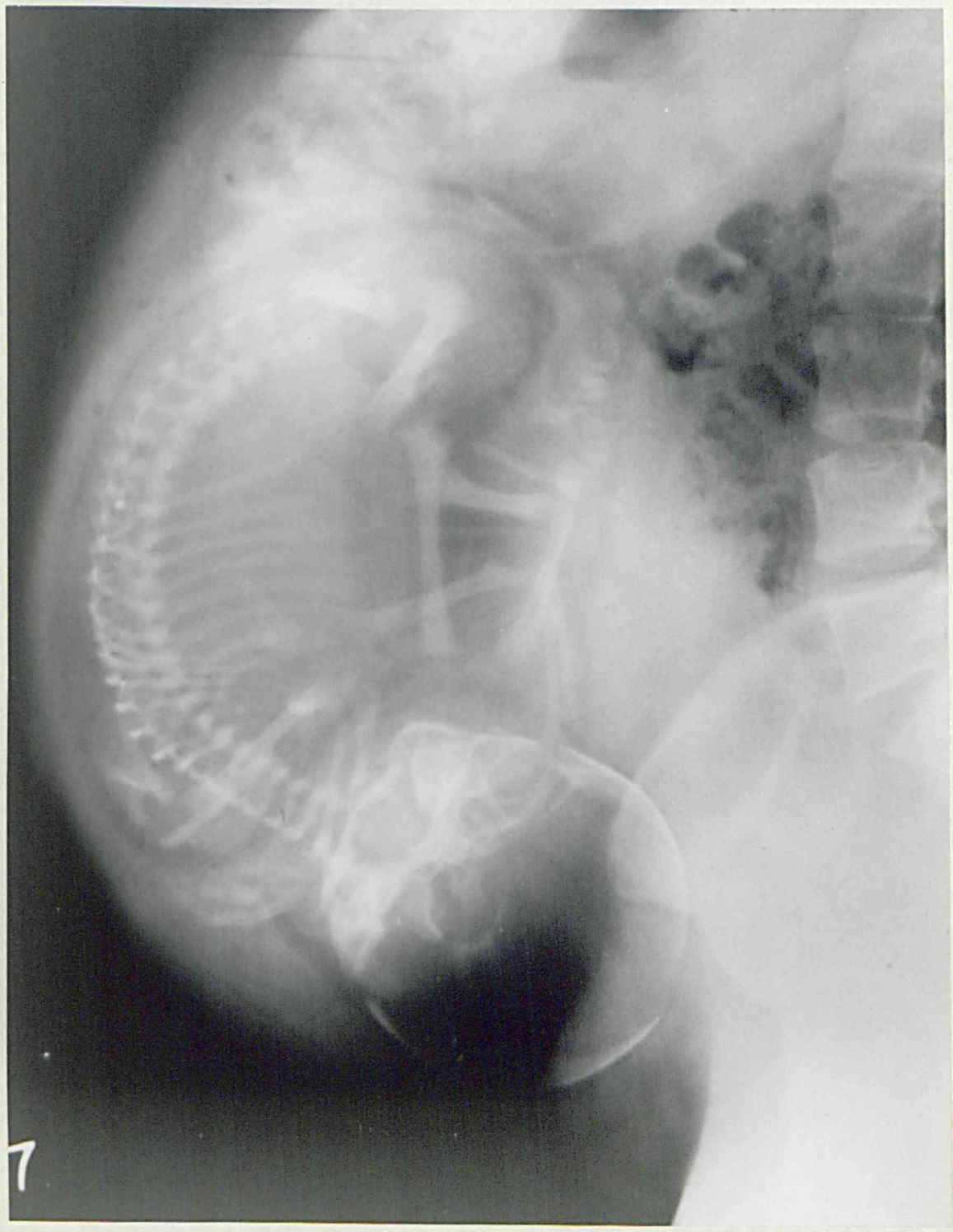


Figure 2. The same case as Figure 1. Soft tissue radiography demonstrates the posterior placenta praevia in the lateral view of the abdomen.

2). In some cases especially where the placenta is anterior, or where relatively little liquor is present, the procedure is difficult to carry out. In these cases it may be hard to know when the injection is being made into the liquor.

3). The method is time consuming and difficult to arrange as an out-patient investigation during an ante-natal clinic.

4). Comparison of this method with that of soft tissue radiography shows no improvement in diagnostic value accruing from the use of the contrast medium. This is well shown in Figures 1 and 2.

Amniography has, however, proved of value in the present investigation in two respects. Firstly, in confirming that the placental site was correctly predicted by the soft tissue radiography method, and secondly, in helping to interpret the soft tissue outlines obtained with this method.

(2). Use of Selective Media.

A). For the Placenta.

The ideal method for radiological location of the placenta would be a contrast medium, which on administration to the mother would be found in such a concentration in the placenta that the latter would be outlined by x-rays.

Thorium dioxide was used for this purpose by Ehrhardt in 1932 and in 1939, by Katsuya in 1932 and by Heuser in the same year. Unfortunately, although its concentration in the placenta was sufficient to be radiographically identifiable, it was toxic to both mother and foetus.

As yet no satisfactory medium has been found, but perhaps with the advent of radio-active tracer elements, such a compound non-toxic to both mother and foetus, may yet be discovered.

B). For the Liquor.

Albano (1928) used a variety of compounds hoping that these would pass through the placental barrier into the liquor. This method was not primarily designed for placentography, but to opacify the liquor to aid in the diagnosis of early pregnancy. He claimed greatest success with sodium tetraiodophenolphthalein.

It is possible that a suitable compound for this method may eventually be found, in which case it would offer the advantages of the amniographic method without its surgical risks.

(3). Aortography.

By this method an embolus of opaque medium can be sent into the maternal circulation of the placenta in sufficient concentration to be identified radiographically. This procedure has been reported by Coutts, Opago, Bianchi and Donozo in 1935, Hartnett in 1948 and Sante in 1951, but it is difficult to believe that this method of investigation could become sufficiently free from risk to be universally accepted for all cases.

(4). Use of Radio-active Isotopes.

The placenta has been located in the intact human uterus by means of radio-active sodium. Browne in 1950 and 1951 employed this method in a total of 118 cases, and a high percentage of accuracy was confirmed clinically.

Figure 3. Lateral radiograph of the abdomen taken during labour showing an anterior placenta in the upper uterine segment. Other films show the foetus is an anencephalic monster. (Case No. 295).

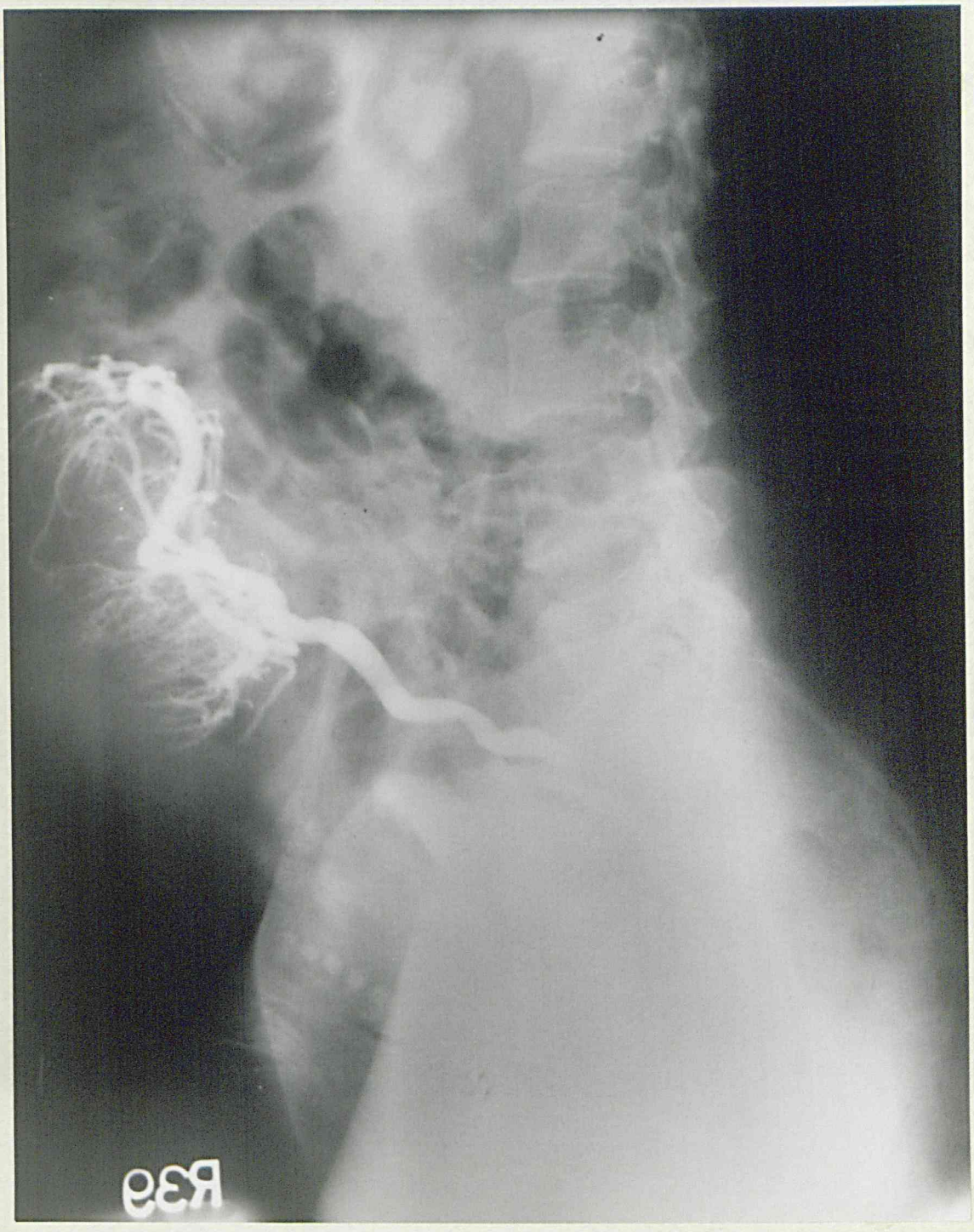


Figure 4. Injection of vessels of the umbilical cord during labour. Placental vessels well filled. No evidence of placental separation. (Same case as Figure 3).

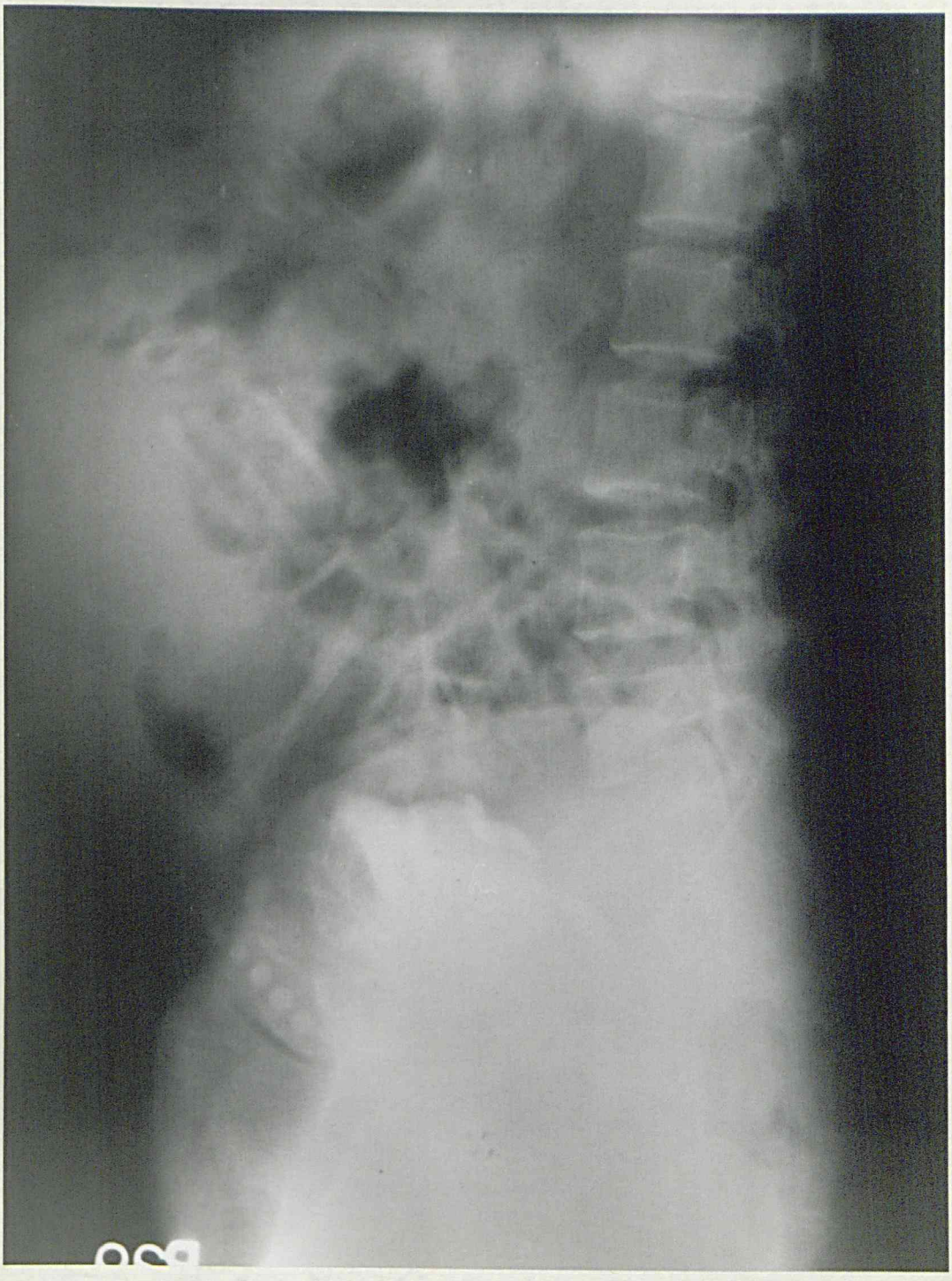


Figure 5. Injection of vessels of the umbilical cord during labour. Good filling of the umbilical vein and the vessels of the foetal liver, the foetal mesenteric and iliac vassels are also outlined. (Same case as Figures 3 & 4).

(5). Injection of the Vessels of the Umbilical Cord.

In the third stage of labour, it is possible to inject opaque media into the umbilical artery, and so radiographically to visualize the placental vessels.

This method has been used to investigate the location of the placental site and its mode of separation. Robinson and Boyd in 1947, Burton-Brown in 1949 and Stallworthy in 1951 have reported the use of this method in the third stage.

Occasionally, in the presence of foetal abnormality incompatible with life, it is possible to perform this technique before delivery by way of a prolapsed cord. This was found practicable twice in the present series and one of these two cases is illustrated in Figures 3, 4 and 5, the foetus being an anencephalic monster.

The method is of very limited value in so far as it is applicable only to a few cases before delivery. It is of considerable value as a method of identifying the placental site after delivery.

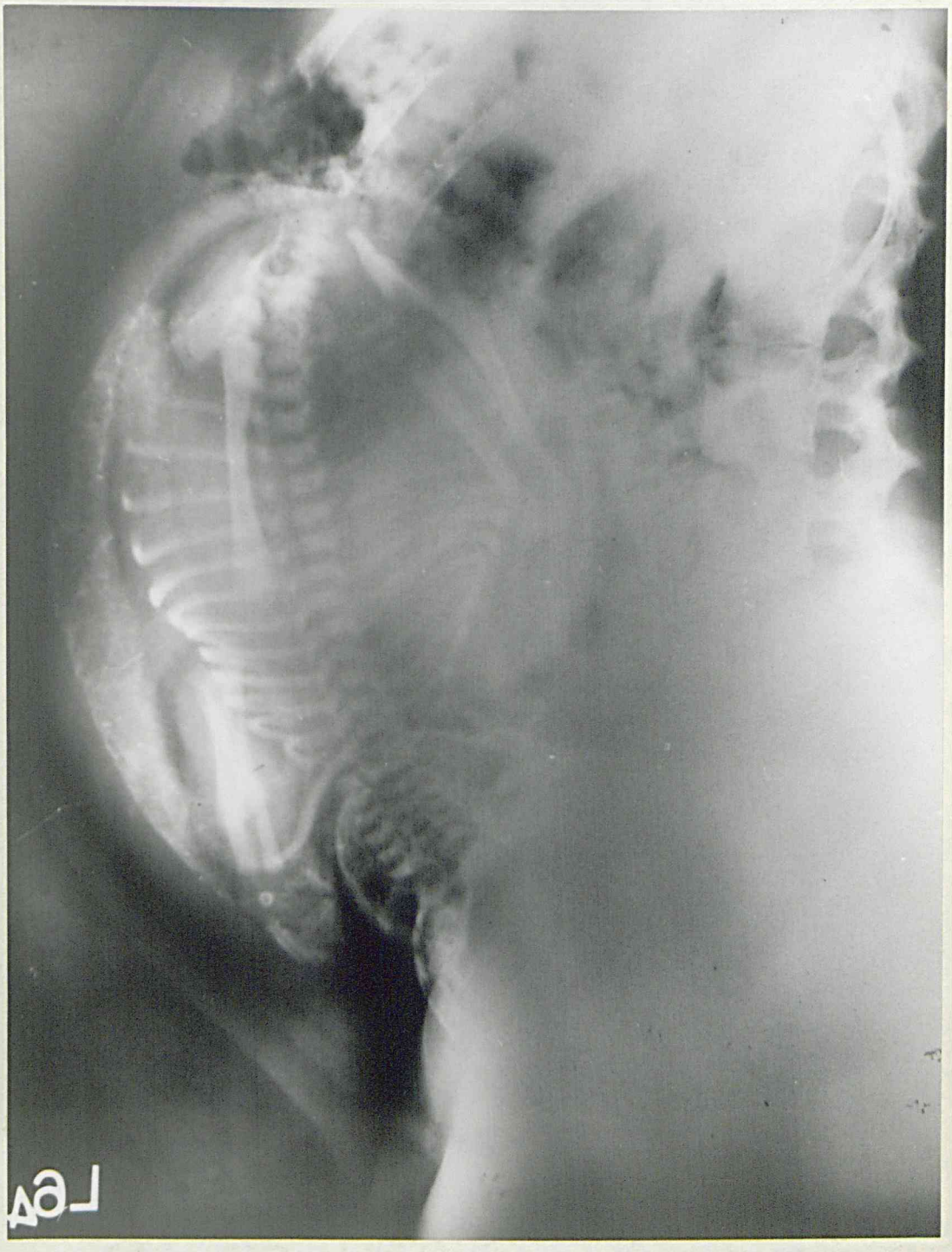


Figure 6. Calcification in the placenta which lies on the anterior and left lateral uterine walls. In this lateral view of the abdomen the greatest thickness of the placenta is not incident to the x-rays. (Case No. 68).

## CHAPTER 4

## SOFT TISSUE RADIOGRAPHY

Calcification occurs in the placenta, and this calcification can be visualized radiographically. Staveley in 1932 recording this noted that this fact might be useful in the diagnosis of placenta praevia. A case of calcification in the placenta is shown in Figure 6. It has been found in this series that at or near term calcification can frequently be visualized in the placenta.

This is in agreement with the findings of Fleming, who in 1943 published his results of radiographing 200 placentae after their delivery, for 50 per cent. showed moderate and 9 per cent. very marked calcification. The uncertainty of its presence and the necessity for diagnosis earlier in pregnancy, where such calcification is very rarely shown radiographically, makes this an unreliable method for location of the placental site.

Credit for the observation that the placental site could be recognised radiographically by soft tissue radiography belongs to Snow and Powell. In 1934 they wrote: "We have been able to demonstrate the placenta in the routine roentgen examination of the abdomen of pregnant women in a very high percentage of cases". They described it as occupying about one-third of the wall space of the uterus, bulging in the middle and tapering towards the periphery. On edge it was about 7 cms. thick, and in almost all cases the ventral part of the foetus faced it. They described it as being indented by limbs, and

between the bones of the limbs and the placenta, they found a "black line" which they thought might be due to the relative radio-translucency of the foetal fat. They added that although the placental shadow and that of the uterine wall were of equal density radiographically the placenta appeared denser than the liquor, which was represented on the radiographs by a black line, apparently the same "black line" which they had already suggested might be due to foetal fat. They used two radiographic views, an antero-posterior view and a lateral view of the abdomen.

With similar techniques Snow and Rosensohn in 1932, Dippel and Brown in 1940, Buxton, Hunt and Potter in 1942, Stander in 1942, Smith in 1943, Torpin and Holmes in 1943 and Bishop in 1945 recorded series of cases.

A modification of technique was introduced by Vaughan, Weaver and Adamson in 1942. They noted that in the lateral radiograph of the abdomen the anterior abdominal wall and structures close to it tended to be over-exposed in relation to the maternal spine and adjacent tissues, and high intensity illumination of the anterior part of the film had to be employed to counter this. In order to produce a radiograph of even density which could be viewed as a whole with light of equal intensity, they introduced a plastic opaque screen. This screen gave rise to selective absorption of the x-rays, maximal anteriorly and minimal posteriorly, during the radiographic exposure, and thus a radiograph of even density was produced. Fifty-two cases were recorded with "excellent results". Baylin and Lambeth in 1943 also used a plastic filter.

Reid in 1949 recommended an aluminium filter applied close to the anode of the x-ray tube as a method of selective absorption of radiation. His paper was published during

the early part of this work, whilst experiments with filters were proceeding. The carefully contoured shape of Reid's filter has been found, in this series, to show little advantage over a much simpler design which is illustrated below.

Lloyd and Samuel in 1941 used a tomographic method of soft tissue radiography with some success. The method has not subsequently received attention, probably because of the relatively long exposures required and resultant high dosage of x-rays received by the patient and the foetus.

# CHAPTER 5

## PRESENT METHOD

### Present Technique for Demonstration of the Placental Site by Soft Tissue Radiography.

To be of real value the technique employed must demonstrate the soft tissue shadows which have been discussed, and, therefore, radiographs of high quality are essential. Errors in interpretation frequently arise when a diagnosis is attempted from radiographs of unsatisfactory quality, owing to poor definition of the relevant soft tissue shadows.

### Preparation of the Patient.

As a preliminary to radiological examination the patient's bladder and rectum should be emptied. A full rectum or bladder may cause displacement of the presenting part. If this preparation of the patient is not possible, extra care in securing radiographs of very high quality may compensate and the relevant soft tissue shadows still be clearly defined.

The presence of gas in the bowel excluding the rectum and sigmoid colon is advantageous, as the contrast between its shadow and the soft tissue shadow of the periphery of the uterus helps to define the uterine outline.

The patient should be dressed in a thin cotton gown only, closed at the front, but open at the back to facilitate positioning of the patient.

The Radiographs which may be required are:-

1). An erect lateral radiograph of the pelvis of the patient.

2). A lateral radiograph of the patient's abdomen, in the recumbent position.

3). Right and left radiographs of the patient's abdomen in the recumbent oblique position.

4). A postero-anterior radiograph of the patient's abdomen, in the prone position, or in some cases an antero-posterior radiograph in the supine position.

5). If the patient cannot stand, a lateral radiograph of the pelvis with the patient tilted to the maximum degree permissable.

(1). The Erect Radiograph of the Pelvis of the Patient.

For this radiograph an upright Potter-Bucky Diaphragm is essential.

The patient stands in the true lateral position, with one side in contact with the diaphragm. Either side may be in such contact, but it is advisable to use the same lateral position for every case. This leads to uniformity of technique, and helps the radiographer to appreciate the correct positioning of the patient with respect to the apparatus.

The patient's arms are folded, so that they are outside the area exposed, and the patient's weight should be distributed equally between her feet placed about six inches apart. The long axes of the feet must be parallel as this ensures superimposition of the outlines of the patient's femoral necks and upper shafts. Failure to observe this rule tends to obscure relevant soft tissue and bony outlines by parts of the femora.

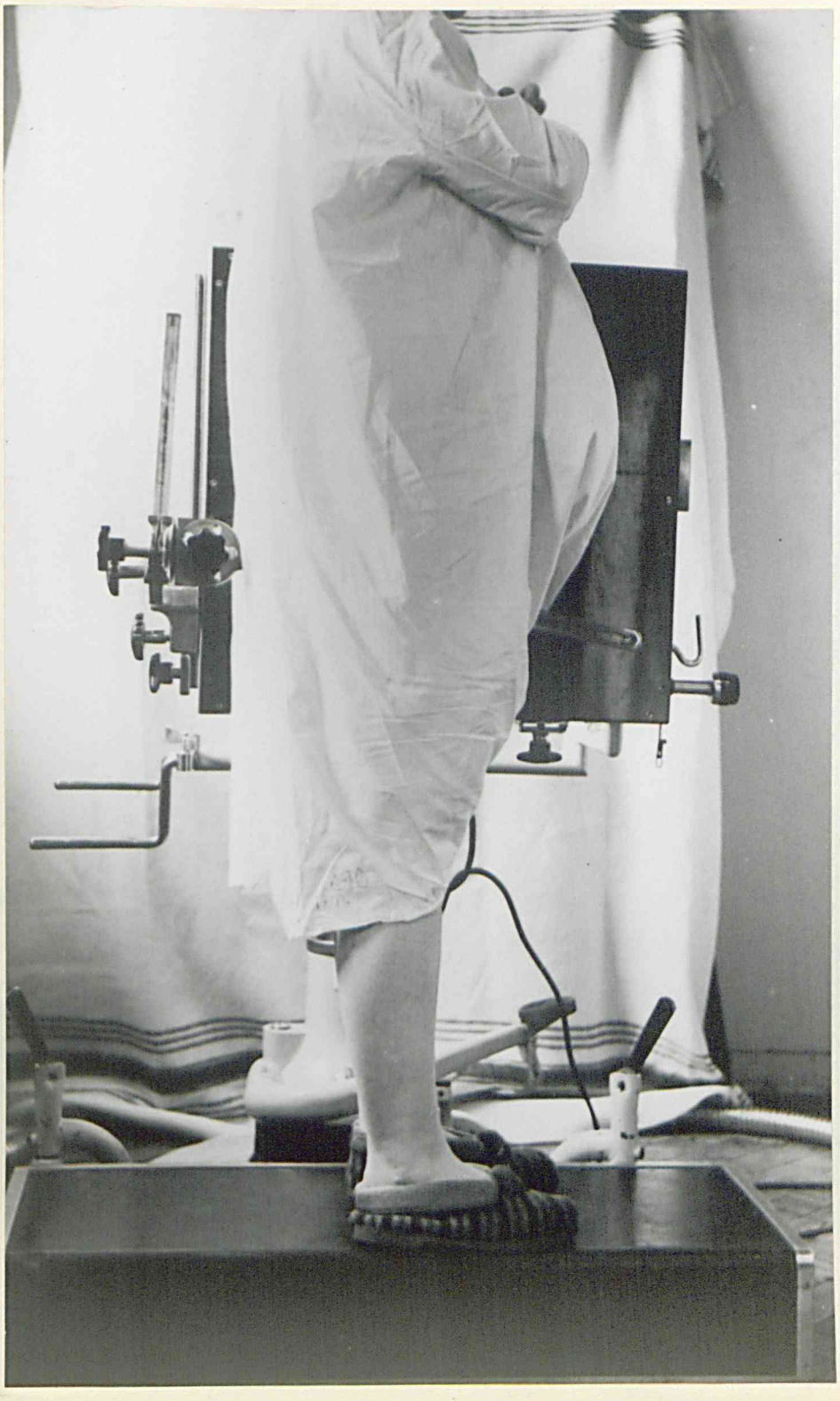


Figure 7. Patient positioned for the erect lateral radiograph of the pelvis.

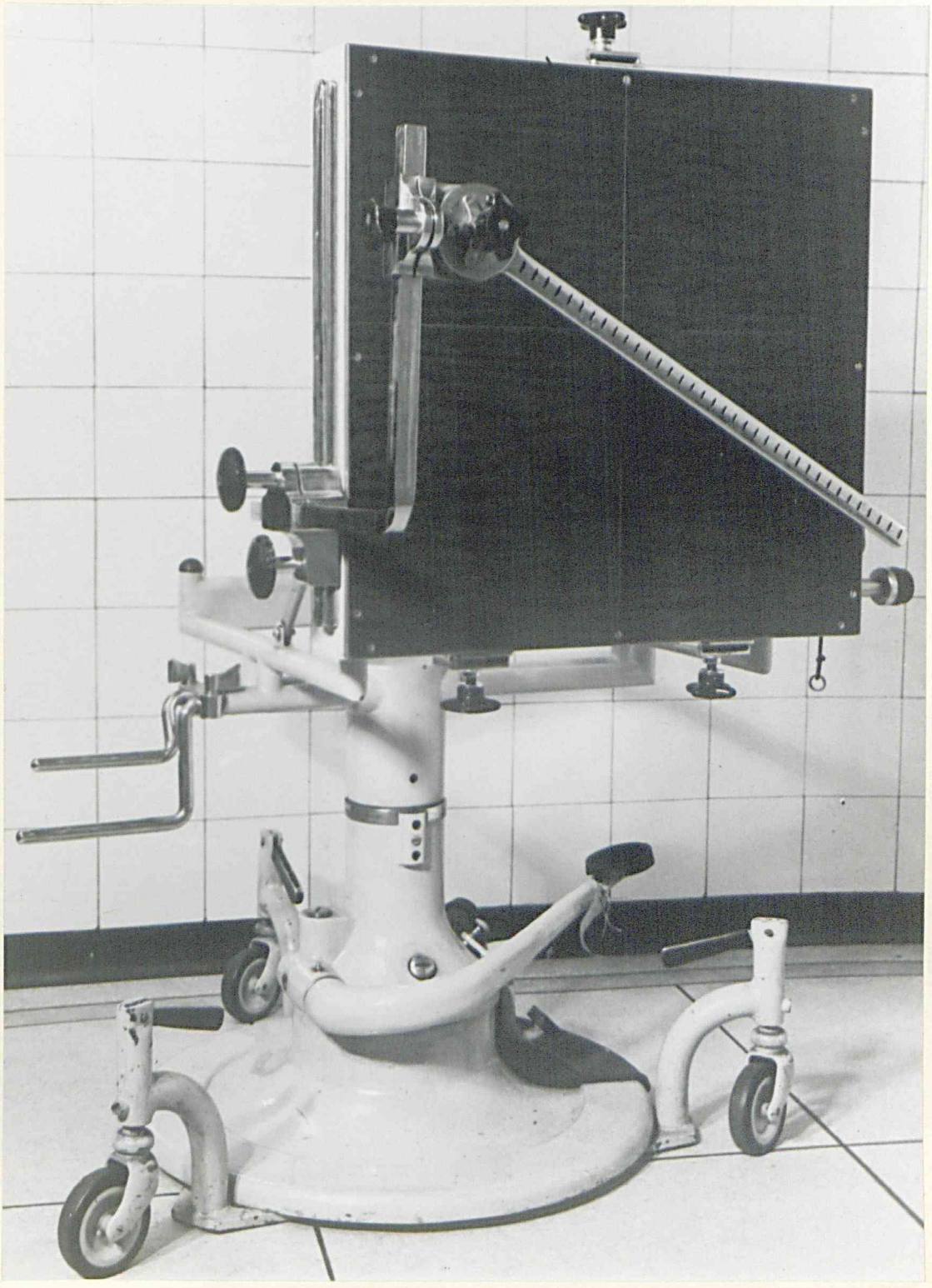


Figure 8. Erect lateral pelvimetry measurement apparatus. The device is attached to an upright Potter-Bucky diaphragm. The rule is held parallel to the film, but can be adjusted both vertically and horizontally.

It is convenient to position the patient and the diaphragm so that the greater trochanter of the side in contact with the film is at the centre of the diaphragm, and therefore, the film.

A binder to help the patient maintain her position, has been found to be unsatisfactory. The application of it tends to rotate the patient, and on balance this disadvantage seems to outweigh its support for the patient. The position is shown in Figure 7.

A measurement scale is introduced on to the radiograph by a perforated metal bar which is held between the patient's legs in the true sagittal plane of the pelvis. This is achieved with the simple apparatus shown in Figure 8 with which the bar is held parallel to the film at any chosen height, and distance from the film. The bar is magnified to the same extent as the sagittal plane of the pelvis and direct measurement of the antero-posterior pelvic diameters may therefore be made from the perforations in the bar. The distance between the centre of each perforation in the rule illustrated is half-an-inch. The X-ray tube is centred on the patient so that the central ray passes through the upper posterior border of the acetabulum, at right angles to the film. The focal film distance should be at least 36", as used in the present investigation, but this may be limited by the output of the x-ray apparatus.

The film used should be a fast screen film, and its size must be at least 15" by 12". The intensifying screens must be fast, but of sufficient quality to produce fairly high definition. For this series Fast Tungstate Screens have been used.

The kilovoltage (K.V.) and milliampere-seconds (m.A.s.) used are dependant on the width of the patient and her bony and muscular development. It is desirable to

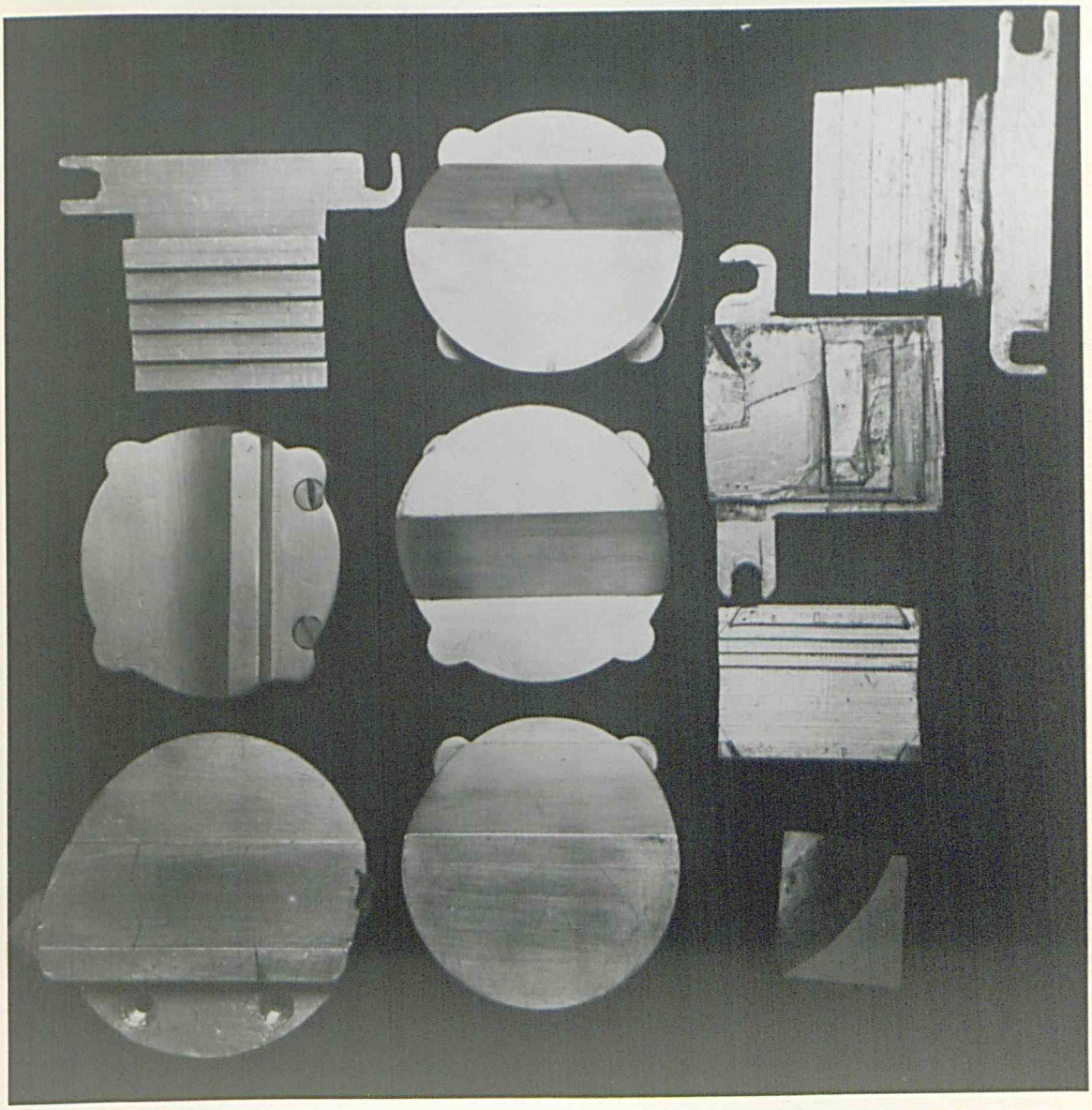


Figure 9. Some of the experimental filters from which the present filter was developed.

use the maximum K.V. and m.A. so that the exposure may be reduced to the minimum. This produces better radiographic definition by decreasing the amount of maternal or foetal movement possible. It is advantageous to have a rather under-exposed radiograph, so that the maximum definition of the soft tissues can be obtained.

For an average case at or near term the following factors are used:- 100K.V : 100 m.A.: 1½ secs.: 36" focal film distance: fast tungstate screens: 15" x 12" fast screen film: Potter-Bucky diaphragm: maximum coning to film size.

(2). The Lateral Radiograph of the Patient's Abdomen.

The technique for this film has been subject to repeated changes in all its aspects over the period in an effort to obtain better radiographs. The method described below produces satisfactory radiographs, but there is a wide latitude in many of the factors, and no special claim is made that those described are ideal.

In a routine lateral radiograph of the abdomen in pregnancy, the structures close to the abdominal wall, and the abdominal wall itself, are over-exposed if the spinal column and structures close to it are in correct exposure. It follows, therefore, that some selective device must be employed if both anterior and posterior structures are to be clearly visualised on the same radiograph.

This can be achieved by filtration of the x-rays produced by the radiographic exposure. This filtration may be made at any level between the anode of the x-ray tube and the x-ray film.

Over the period of the investigation many media were tried in all positions relative to the anode, including various double grid and special screen effects. Experimental filters are shown in Figure 9. The method now outlined

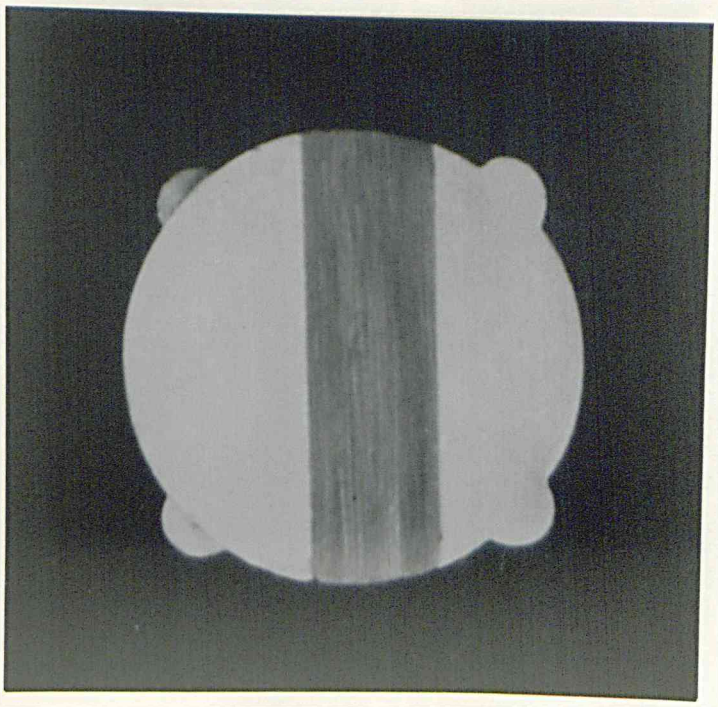


Figure 10. The present filter (actual size). The photograph shows the surface of the filter which faces the patient.

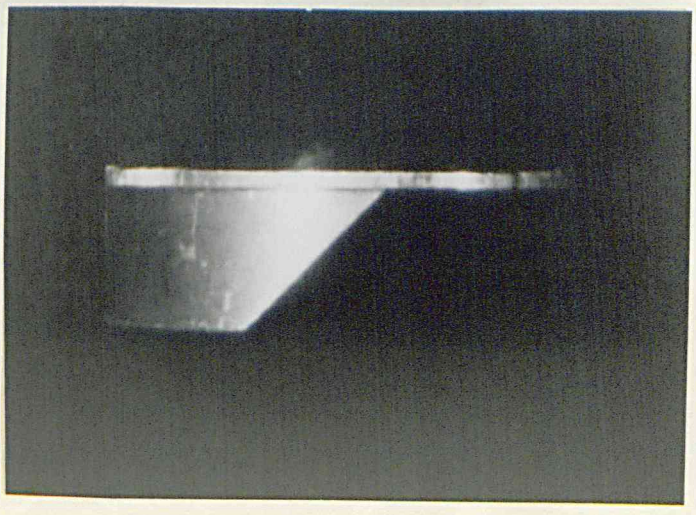


Figure 11. The present filter (actual size). Side view of the filter, the thick part of the filter is positioned over the anterior abdominal wall of the patient.

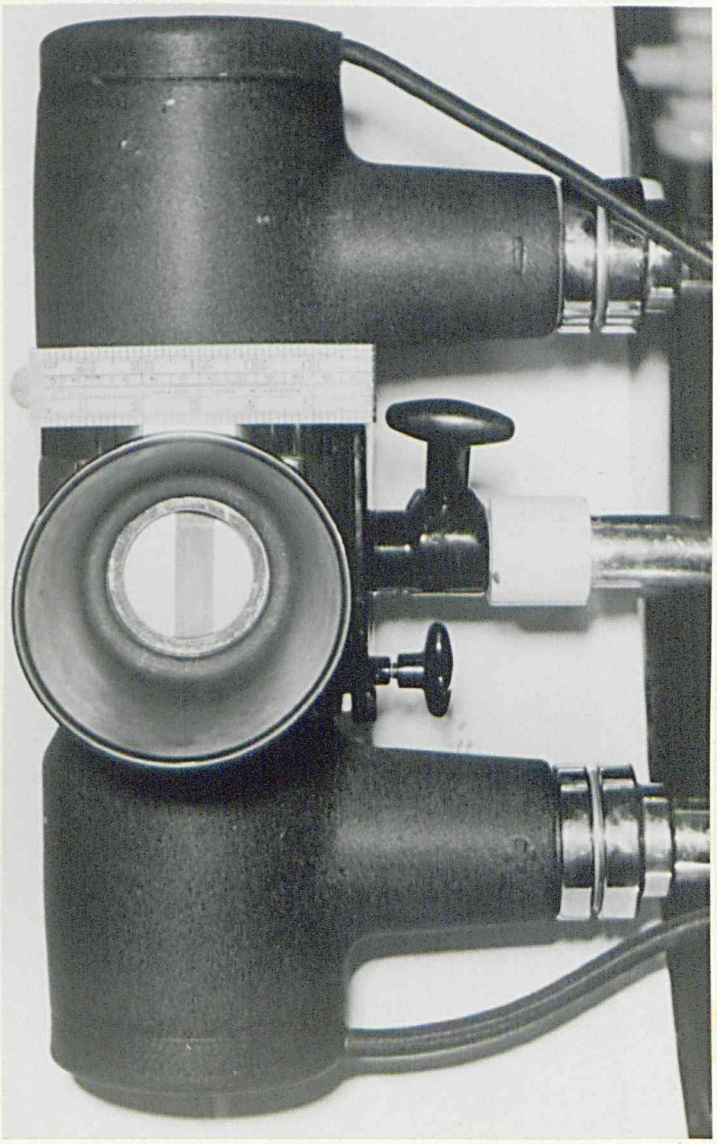


Figure 12. The present filter fitted in the casing of a Mullard R.A. x-ray tube. It is held in position by the cone.

was developed as a result of this experience, and has produced satisfactory results. It is very simple to carry out and requires only the piece of apparatus illustrated. It is easily made, and can be fitted to the x-ray tube head quickly. The same method or a simple adaptation of it could be carried out in any X-ray Department.

The Filter.

This was designed as a result of experience with an adjustable step wedge filter, made of loose strips of aluminium. By trial and error, the steps were adjusted until satisfactory results were obtained. There is a wide range of slope and thickness which will produce a satisfactory result and these must be matched with suitable radiographic factors.

The thick part of the filter is arranged over the anterior abdominal wall and the slope inclines towards the patient's back. Thus its effect is to reduce the amount of x-rays falling on the anterior side of the patient's abdomen.

The illustrations (Figures 10, 11 and 12) show the filter made of aluminium, in actual size, and the simple way in which it is fitted to the casing of a Mullard R.A. tube. The advantage of filtration applied close to the anode is that the resultant radiograph shows only the effect of filtration, and no evidence of confusing shadows produced from the filter's structure.

The patient is placed lying on her side in the true lateral position on the x-ray table. Her thighs are extended, so that the maximum of abdominal wall is shown on the radiograph, freed from superimposed thigh shadows. The position is easily maintained if the knees are flexed

Figure 13. Patient positioned for the lateral radiograph of the abdomen.

to a right angle. The patient's arms are partly extended and the hands clasped together so that they are not allowed to obscure the radiograph. Figure 13 shows this position.

The x-ray tube is centred so that the central ray passes through the centre of the patient's uterus, at right angles to the x-ray table and film. The film is arranged to cover the whole of the patient's abdomen, including the anterior abdominal wall anteriorly, the spinal column posteriorly, the pelvic inlet inferiorly and the fundus superiorly, so that these will be included on the radiograph.

For women at or near term a 17" by 14" film is required, and this should be a fast screen film. Fast Tungstate Screens, and a Potter-Bucky diaphragm are used. By experiment it has been found that the best radiographs are obtained where a very short radiographic exposure is used. This reduces movement by the patient, her uterus or the foetus to a minimum, and so increases radiographic definition. Similarly, a long focal-film distance produces better results than shorter distances. Most x-ray apparatus limits the available K.V. and m.A., so that for a longer focal-film distance the radiographic exposure must in general be increased. Shorter radiographic exposures may be utilized if a high K.V. technique is used. The factors now outlined have with the apparatus used, produced the best results, and are a balance between maximum focal-film distance and the shortest radiographic exposure, within the capacity of the x-ray apparatus.

For an average woman at or near term the following factors would be used:- 90 K.V.: 300 m.A.: 0.3 secs.: 40" focal film distance: fast tungstate screens: 17" x 14" fast screen film: Potter-Bucky diaphragm: maximum coning to film size.

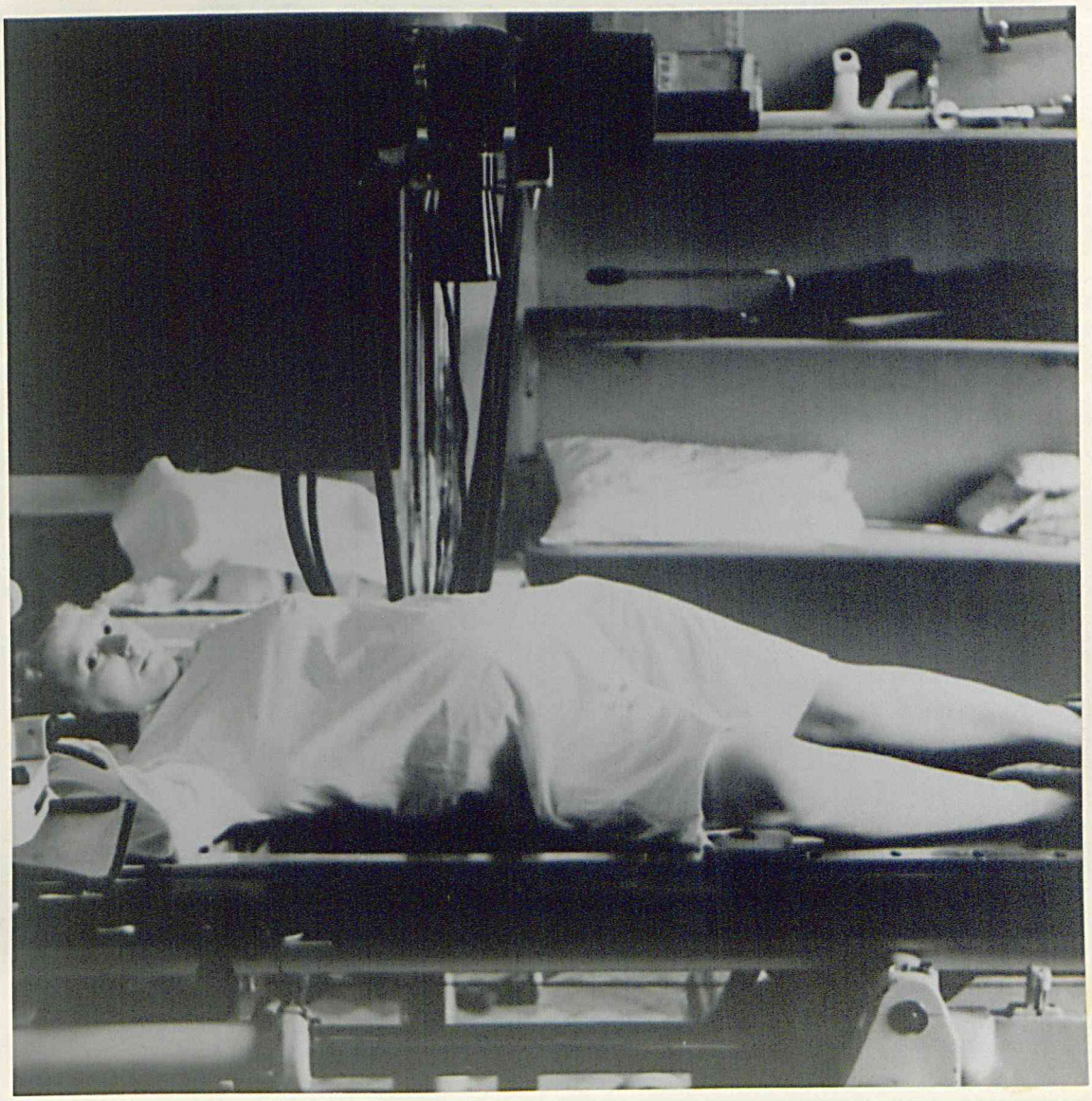


Figure 14. Patient positioned for the right oblique radiograph of the patient's abdomen.

(3). Right (R) and Left (L) Radiographs of the Patient's Abdomen in the Oblique Position.

These radiographs are made without a filter. The patient lies on the x-ray table in the lateral position and is then turned partly on to her back, so that her sagittal plane lies at an angle of approximately 30° to 40° to the vertical. The position is maintained by inserting a pillow under the shoulder which is raised from the table, and by separating the patient's legs, so that both feet rest on the table. (R) and (L) sides are each arranged close to the table for the two radiographs. Figure 14 shows this position.

The same arrangement of film and centering point is made as for the lateral radiograph of the abdomen. The radiographic factors are again governed by the desirability of having a long focal-film distance and a short radiographic exposure.

For the average patient at or near term the following factors would be used:- 90 K.V.: 300 m.A.: 0.3 secs.: 40" focal film distance: 17" x 14" fast screen film: fast tungstate screens: Potter-Bucky diaphragm: maximum coning to film size.

(4). A Postero-anterior Radiograph of the Patient's Abdomen in the Prone Position or in some cases an Antero-posterior Radiograph in the Supine Position.

The recognised technique is used for this film, but the factors are standardised so that all films may be compared, one with another.

This necessitates using standard focal film distance, K.V., film and screen speeds, so that variations in the size and density of foetal parts may be compared.

A short radiographic exposure and a long focal film distance are again essential.

For an average patient at or near term the radiographic factors are the same as those for the oblique views:- 90 K.V.: 300 m.A.: 0.3 secs.: 40" focal film distance: 17" x 14" fast screen film: fast tungstate screens: Potter-Bucky diaphragm: maximum coning to film size.

The prone position is preferred provided that the patient can maintain this position; otherwise the supine position is used. The radiographic factors are the same for both positions.

(5). A Lateral Radiograph of the Pelvis with the Patient Tilted.

When the patient is not allowed to stand, this method can be used to replace the erect lateral radiograph of the patient.

With a tilting x-ray table the patient is tilted as near to the upright position as can be allowed. She is then placed in the true lateral position and the same further measures used in the erect lateral radiograph are then applied, and the radiographic factors are the same.

## CHAPTER 6

## THE DEVELOPMENT OF THE SOFT TISSUE METHOD

The original work recorded by Snow and Powell in 1934 was an outstanding contribution to the radiology of location of the placental site. It is unfortunate that in the preliminary statement of their findings there should be a contradiction in their interpretation of the radiographs. They referred to a "black line" tending to define the foetal parts as probably due to liquor, but also suggested the same line might be due to subcutaneous foetal fat. That the black line could be due to liquor was difficult to accept for two main reasons:-

1). The resultant estimate of placental thickness measured by this delineation was too great to be acceptable at least for the majority of placentae.

2). It was soon shown experimentally (Weintraub and Snow in 1939; Chassar Moir in 1944) that not only is the black line due to the subcutaneous fat of the foetus, but that uterus, placenta and liquor are of equal density to x-rays. Radiographically these three produce images of identical density, and no differentiation is possible.

Therefore in spite of rapidly increasing numbers of publications, many with clinical confirmation of the placental site, obstetricians did not place any reliance on the method.

Following the original publication, Snow, with his colleagues in 1938 and 1939 and alone in 1942, added cases to the records and enlarged on the original technique. Ude and Urner in 1935 and together with Robbins in 1938, had combined cystography with soft tissue radiography. They had observed that the soft tissue radiography method was useful for recognition of the placenta in the upper uterine segment. They thought that the "black line" of Snow and Powell was due to vernix caseosa.

Snow with Weintraub in 1939 finally disproved this, and by experiments with an excised limb immersed in water produced strong evidence that the characteristic "black line" was caused by the subcutaneous fat of the foetus. Separately radiographed vernix proved much less translucent than the foetal fat. They noted at this time that the radiograph of a stillborn foetus in a tank of water simulated the radiographic appearances of hydramnios, and that this might present difficulty in soft tissue radiography of the placenta.

Torpin and Holmes in 1943 showed that the shadow regarded as placenta was not affected by changing the position of the patient and therefore stated that it was not cast to any degree by amniotic fluid.

Chassar Moir in 1944 by experimental methods exposed some of the fallacies which were arising in the soft tissue radiography method of diagnosis of the placental site. He showed that:-

1). The "dark line" seen on the radiographs was due to subcutaneous foetal fat.

2). Placenta and liquor are of equal radiographic density and could not be differentiated.

3). The placenta is seldom as thick as shown by the soft tissue method and that part of the shadow is due to liquor.

4). Indentations of the placental shadow by, for example, foetal limbs, could be explained more readily if part of the shadow were due to liquor.

In a commentary by Dippel which followed this publication, it is noted that many of these findings were already accepted.

Chassar Moir's principal criticism, that placenta and liquor are of equal radiographic density does not hinder diagnosis. In the majority of cases, whether the shadow is of placenta alone or that of placenta and liquor together, does not materially affect the diagnosis. The published results from many clinics with hundreds of cases substantiate this.

Bishop in 1945 expressed the view that the uterus, placenta and liquor were of equal radiographic density. The thickness of the "placental shadow" on soft tissue radiography was too thick for it to represent the placenta alone, and he explained the appearance by comparing the placenta to a saucer which was filled with liquor. Hence the "pressure defects" produced by the limbs were simply due to the limbs displacing liquor from this "saucer".

Reid in 1949 reviewed the previous literature extensively and described his findings in three publications. His findings are similar to those of Bishop and compatible with the experimental evidence of Chassar Moir. By measurement, allowing for equal distribution of liquor, he found the placenta by soft tissue radiography to be of 3.3 cms. average thickness. Although rather high this figure was in the upper range of acceptable limits, for a normal placenta. He reviewed the errors that might arise in interpretation. If the placenta were of the membranaceous

type it might be too thin to produce a diagnostic thickening of the soft tissue shadows. If hydramnios were present, local collections of liquor might simulate the placenta. In multiple pregnancy and breech presentation too, diagnosis from the soft tissue radiograph might be difficult.

The results of various workers tabulated in Table I show considerable success in the prediction of the placental site. In the majority of cases the placenta was recognised from the lateral radiograph of the abdomen as either mainly anterior or posterior in position, and almost equally distributed between the two positions

TABLE I

PUBLISHED RESULTS OF LOCATION OF THE PLACENTAL SITE BY SOFT TISSUE RADIOGRAPHY

| Author | Findings | No. of Cases |
|---|---|---|
| Dippel & Brown (1940) 262 cases | Placenta anterior | 130 |
| | Placenta posterior | 106 |
| | Not visualised | 26 |
| | Confirmed clinically without error | 53 |
| Buxton, Hunt & Potter (1942) 108 cases | Placenta localised | 86.1% |
| | Anterior or Posterior Placenta | 74 |
| | Placenta wholly or partly in lower uterine segment | 19 |
| | Subsequently 12 of these cases were confirmed as low implantation or placenta praevia | |
| Stander (1942) 94 cases | Placenta anterior | 49 |
| | Placenta posterior | 40 |
| | Placenta mainly on lateral uterine wall | 2 |
| | Evidence of placenta praevia | 16 |
| Torpin & Holmes (1943) 363 cases | Placenta anterior | 163 |
| | Placenta posterior | 200 |
| Mangees Smith (1943) | He discusses having localised the placenta in 1,000 cases, but gives no detailed analysis | |
| McCort, Davidson & Walton (1944) 132 cases | Diagnosis of no placenta praevia (98 clinically consistent) | 101 |
| | Considered as low marginal implantation (15 clinically consistent) | 25 |
| | Diagnosed as placenta praevia (3 clinically consistent) | 4 |
| Reid (1949) 372 cases | Placenta anterior | 132 |
| | Placenta posterior | 167 |
| | In 42 of these cases the placental site was confirmed and the remainder showed a clinical history consistent. 73 cases considered to have "low implantation". 31 cases were clinically proved, and in the remainder clinical proof was neither sought nor found. | |

TABLE I - contd.

| Author | Findings | No. of Cases |
|---|---|---|
| Stevenson (1949) 474 cases | Placenta anterior | 43.8% |
| | Placenta posterior | 31.6% |
| | Placenta lateral | 9.7% |
| | Placenta fundal | 7.4% |
| | Placenta in lower uterine segment | 7.5% |
| Reid (1951) 518 cases | (1) Normal Implantation | |
| | Anterior | 215 |
| | Posterior | 224 |
| | Fundal | 16 |
| | 26 sites verified without error. | |
| | 1 case subsequently proved to have placenta praevia. | |
| | (2) X-ray evidence of placenta praevia | 44 |
| | Confirmed: 26 at Caesarean section | |
| | 6 vaginally | |
| | 32 | |
| | Not confirmed: 12 | |

## CHAPTER 7

## THE INTERPRETATION OF SOFT TISSUE RADIOGRAPHY

### The Lateral Radiograph of the Abdomen.

In this projection the outline of the uterus is clearly visualised above the level of the pelvic inlet, except posteriorly in its lower part where the lumbar spine and iliac bones tend to mask the outline. The uterine shadow has a sharp edge and is well differentiated from the anterior abdominal wall in front and the abdominal viscera above and posteriorly. Frequently on the original radiographs the layers of the anterior abdominal wall can be differentiated, but reproduction does not preserve such fine detail.

Within the periphery of the uterine outline there is the soft tissue shadow of the uterus itself, which is entirely homogeneous except for the foetal bony parts, and a dense black line of varying depth which tends to surround the limbs, trunk and head of the foetus.

The experimental evidence of Weintraub and Snow in 1939, and of Chassar Moir in 1944 indicates that this black line is due to the subcutaneous foetal fat. Further experimental evidence is now presented in support of this view. Amniography (see Figures 1, 44, 47, 48, 51, 53, 55) shows that this black line separates the foetal skull, limbs and trunk from the liquor, and that the liquor separates the black line from the uterine wall with no possibility of any other interposed tissue apart from the membranes, except

where the placenta is present. Contained within the black line there is only the foetus itself, less the subcutaneous tissue. External to the black line, therefore, the homogeneous shadow will represent not only the uterine wall and, where present, the placenta, but liquor and the almost negligible thickness of the membranes. This is shown diagramatically in Figure 15.

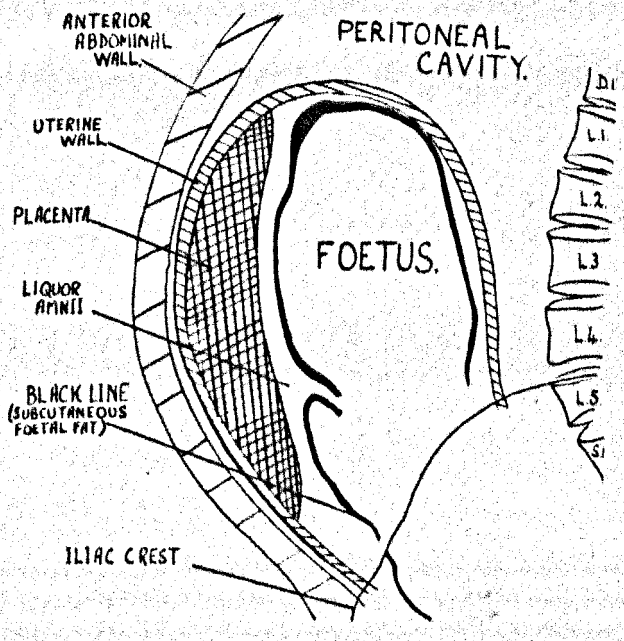



Figure 15.

Inspection of lateral radiographs of the abdomen (Figures 16 to 27) shows that almost without exception there is a unilateral thickening of the homogeneous shadow. This thickening is commonly on the anterior or posterior wall of the uterus and rarely on the fundus. The thickening consists of, from without inwards, uterine wall, placenta, and liquor, and by direct radiography these tissues are seen to

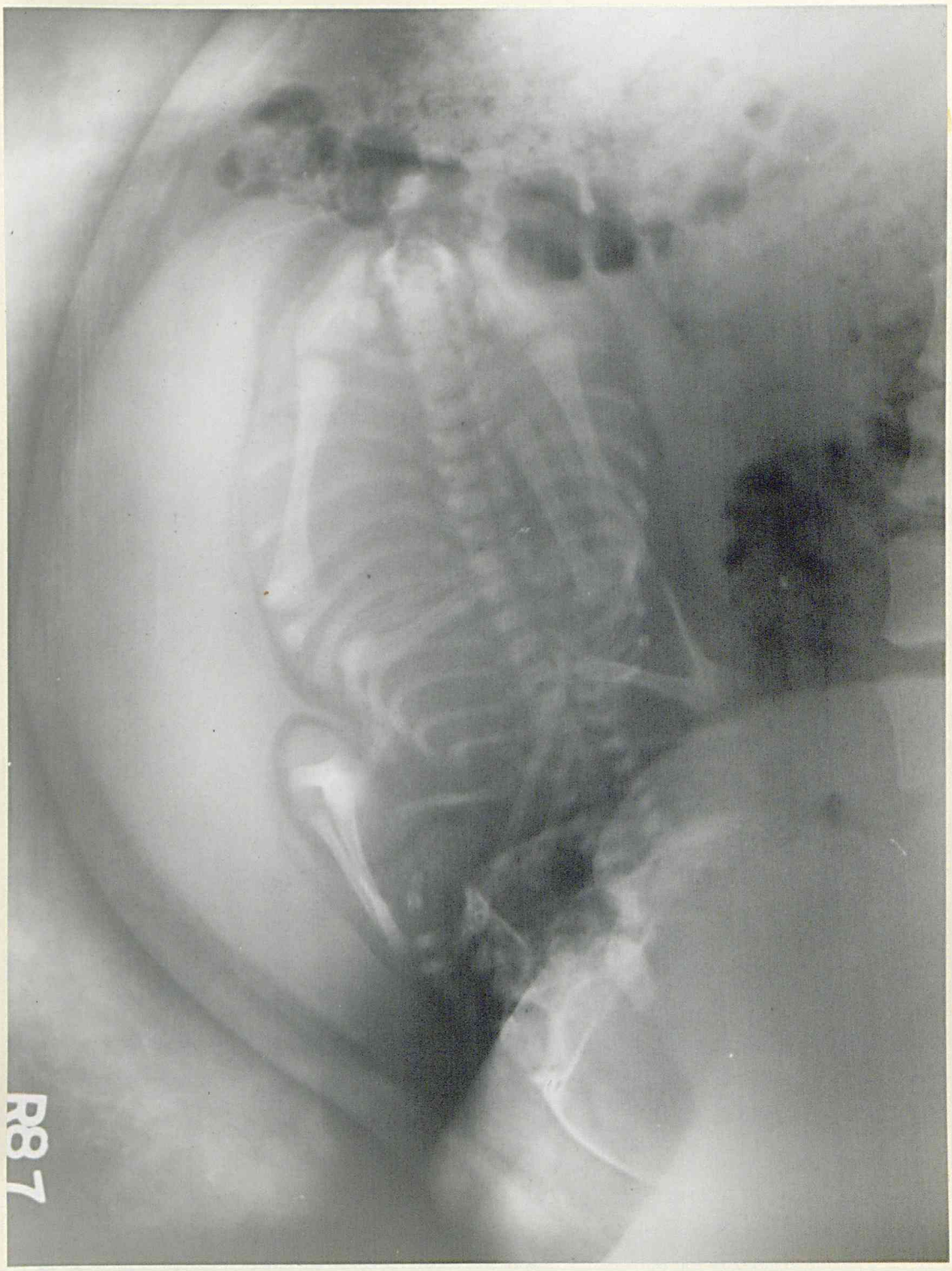



Figure 16. Soft tissue radiography - the lateral radiograph of the abdomen. Anterior implantation of the placenta in the upper uterine segment shown as a unilateral thickening of the soft tissue shadow of the uterus. (Case No. 72).

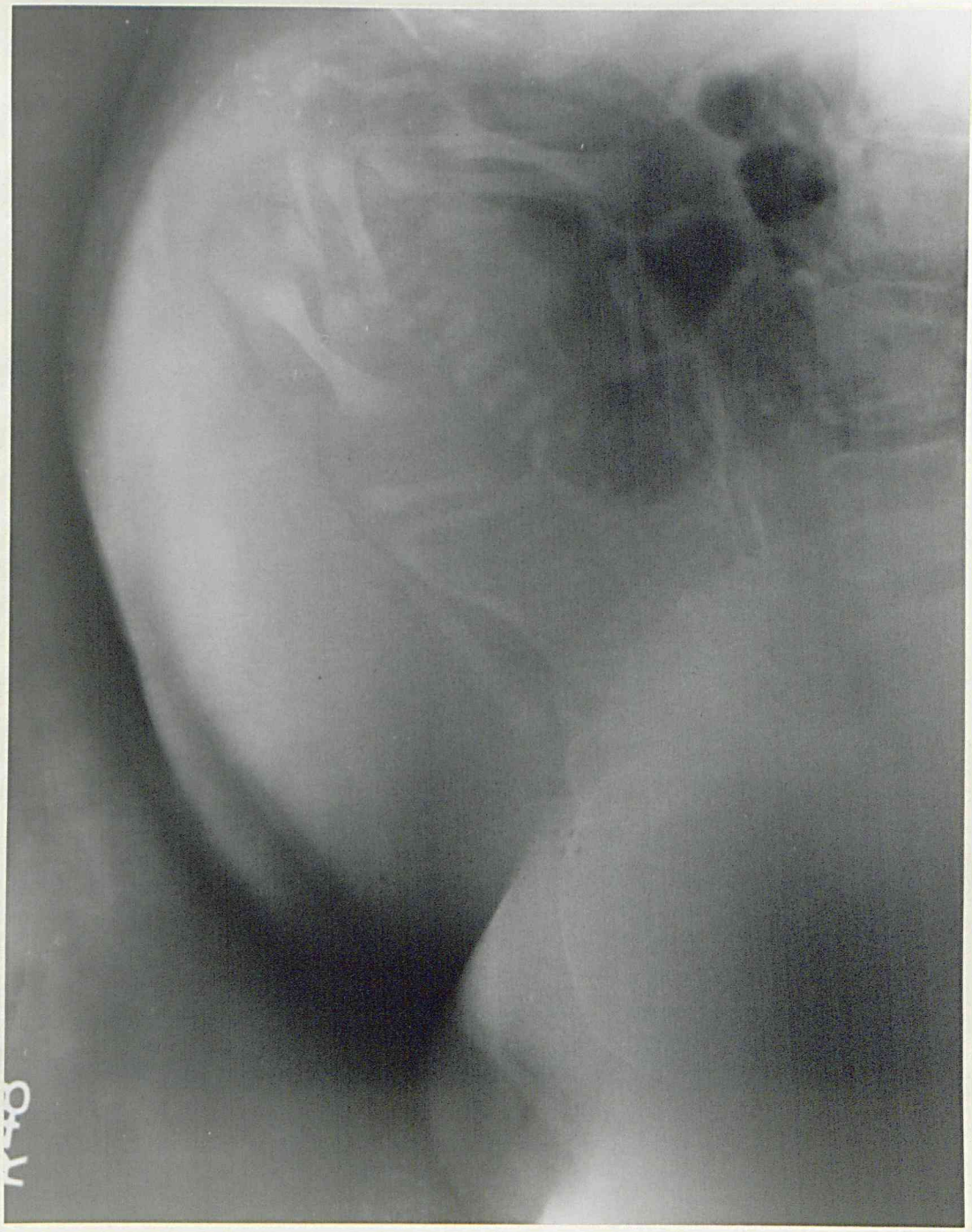


Figure 17. Soft tissue radiography - the lateral radiograph of the abdomen. Anterior implantation of the placenta in the upper uterine segment shown as a unilateral thickening of the soft tissue shadow of the uterus. (Case No. 182).


Figure 18. Soft tissue radiography - the lateral radiograph of the abdomen. Anterior implantation of the placenta in the upper uterine segment shown as a unilateral thickening of the soft tissue shadow of the uterus. (Case No. 274).

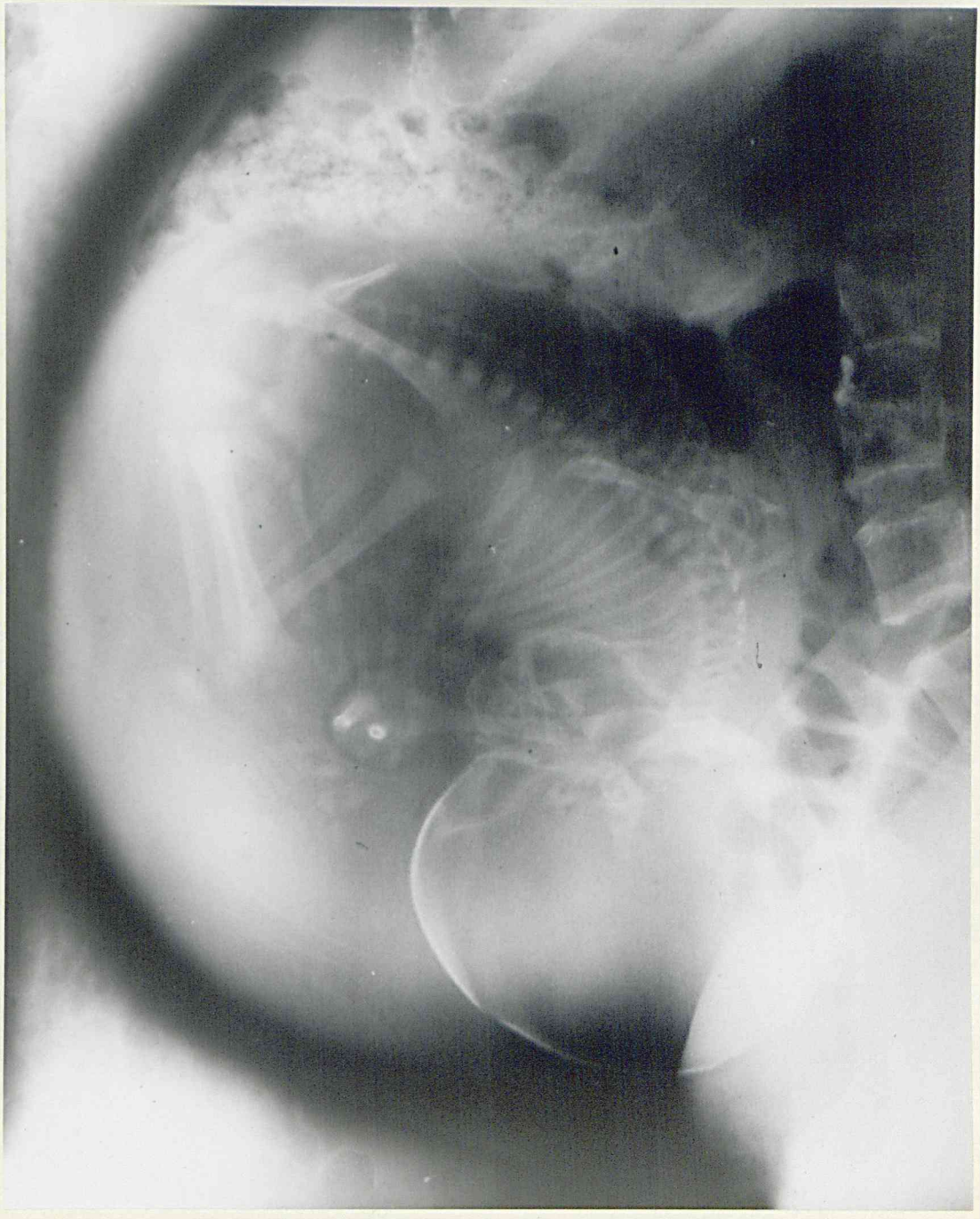


Figure 19. Soft tissue radiography - the lateral radiograph of the abdomen. Anterior implantation of the placenta in the upper uterine segment shown as a unilateral thickening of the soft tissue shadow of the uterus. (Case No. 205).

Figure 20. Soft tissue radiography - the lateral radiograph of the abdomen. Posterior implantation of the placenta in the upper uterine segment shown as a unilateral thickening of the soft tissue shadow of the uterus. (Case No. 406).

Figure 21. Soft tissue radiography - the lateral radiograph of the abdomen. Posterior implantation of the placenta in the upper uterine segment shown as a unilateral thickening of the soft tissue shadow of the uterus. The shadows are clearly defined posteriorly because of the pendulous abdomen. (Case No. 131).

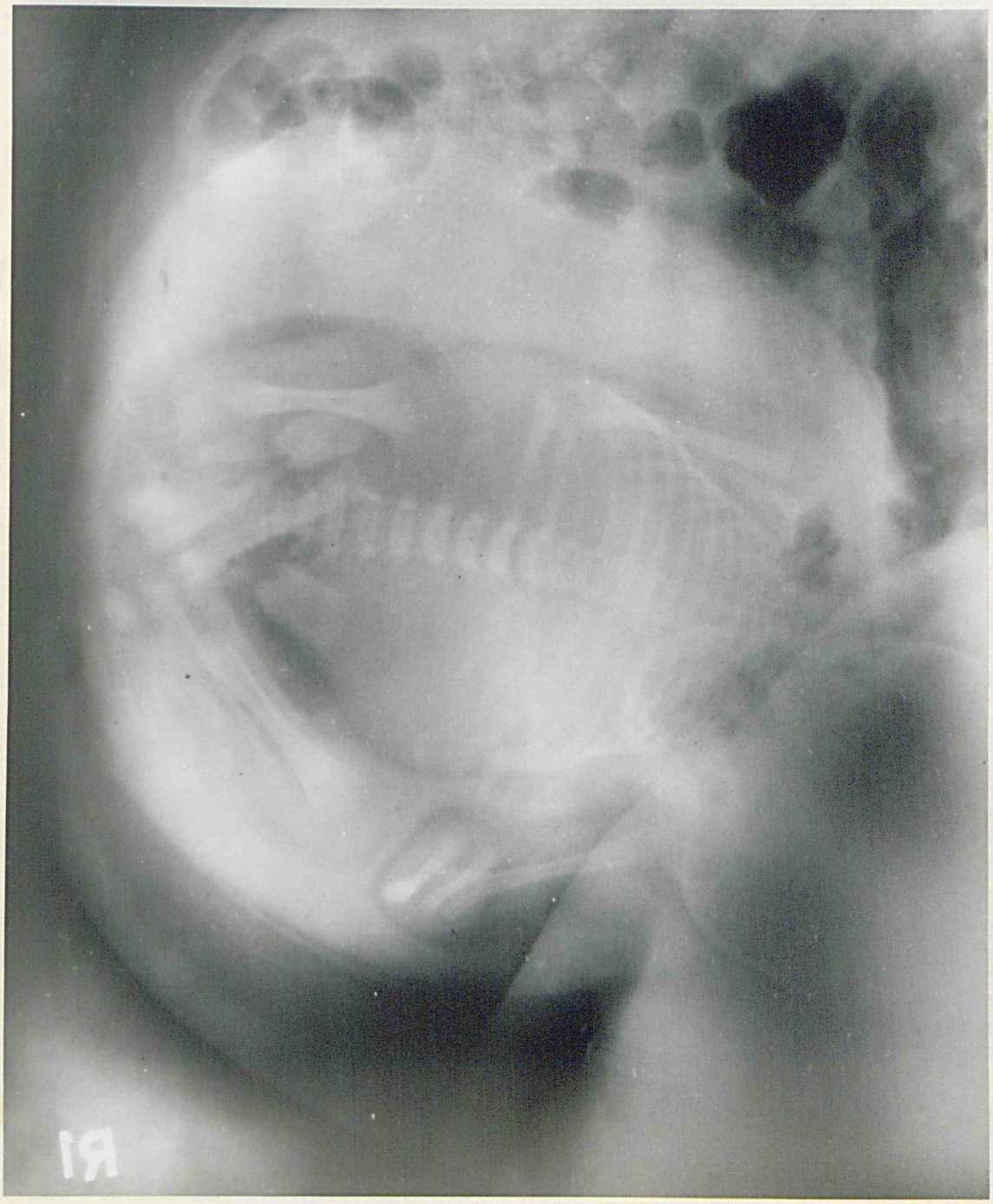


Figure 22. Soft tissue radiography - the lateral radiograph of the abdomen. Posterior implantation of the placenta in the upper uterine segment shown as a unilateral thickening of the soft tissue shadow of the uterus. The shadows are clearly defined posteriorly because of the pendulous abdomen. (Case No. 306).

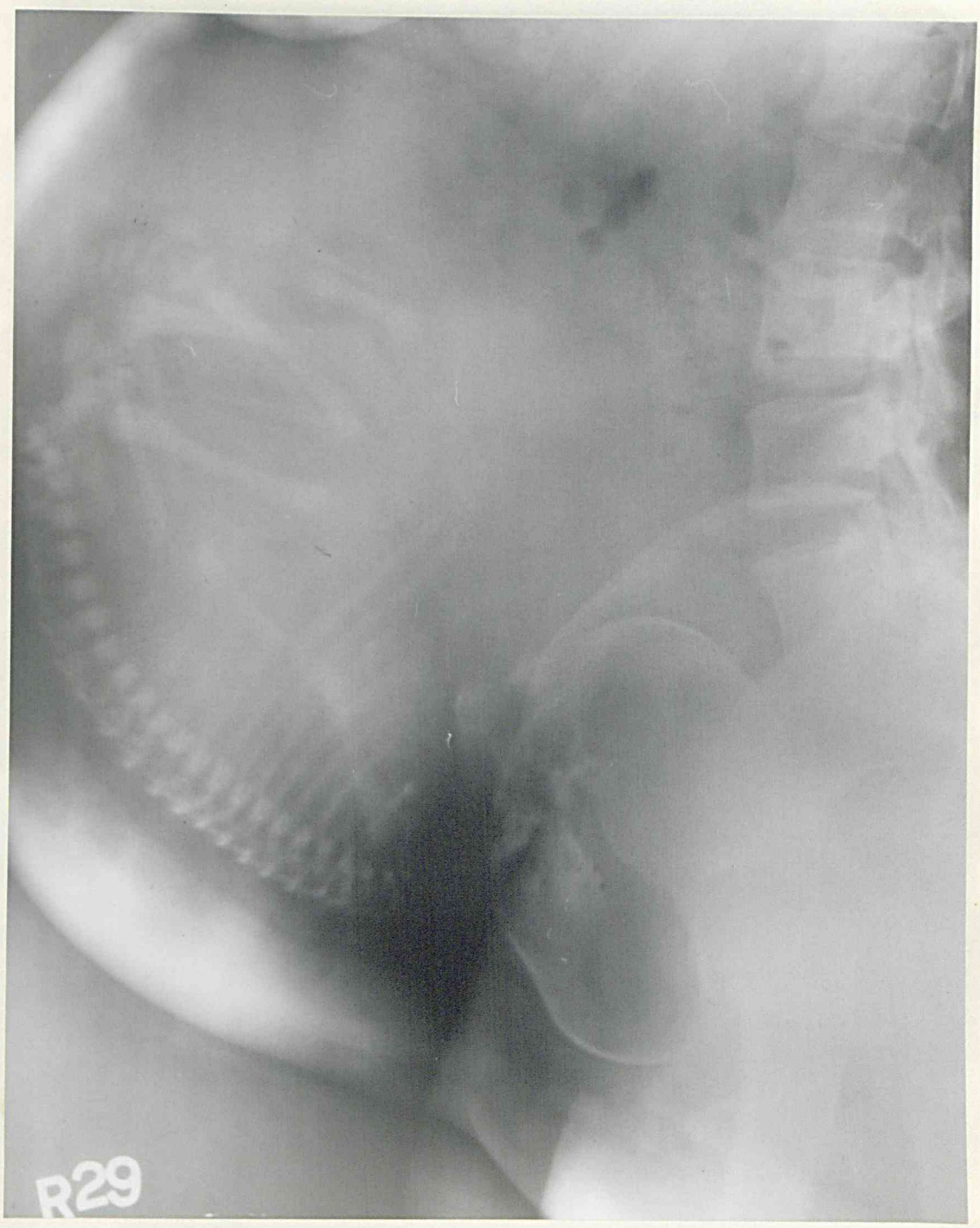



Figure 23. Soft tissue radiography - the lateral radiograph of the abdomen. Posterior implantation of the placenta in the upper uterine segment shown as a unilateral thickening of the soft tissue shadow of the uterus. (Case No. 212).

Figure 24. Soft tissue radiography - the lateral radiograph of the abdomen. Posterior implantation of the placenta in the upper uterine segment shown as a unilateral thickening of the soft tissue shadow of the uterus. (Case No. 128).

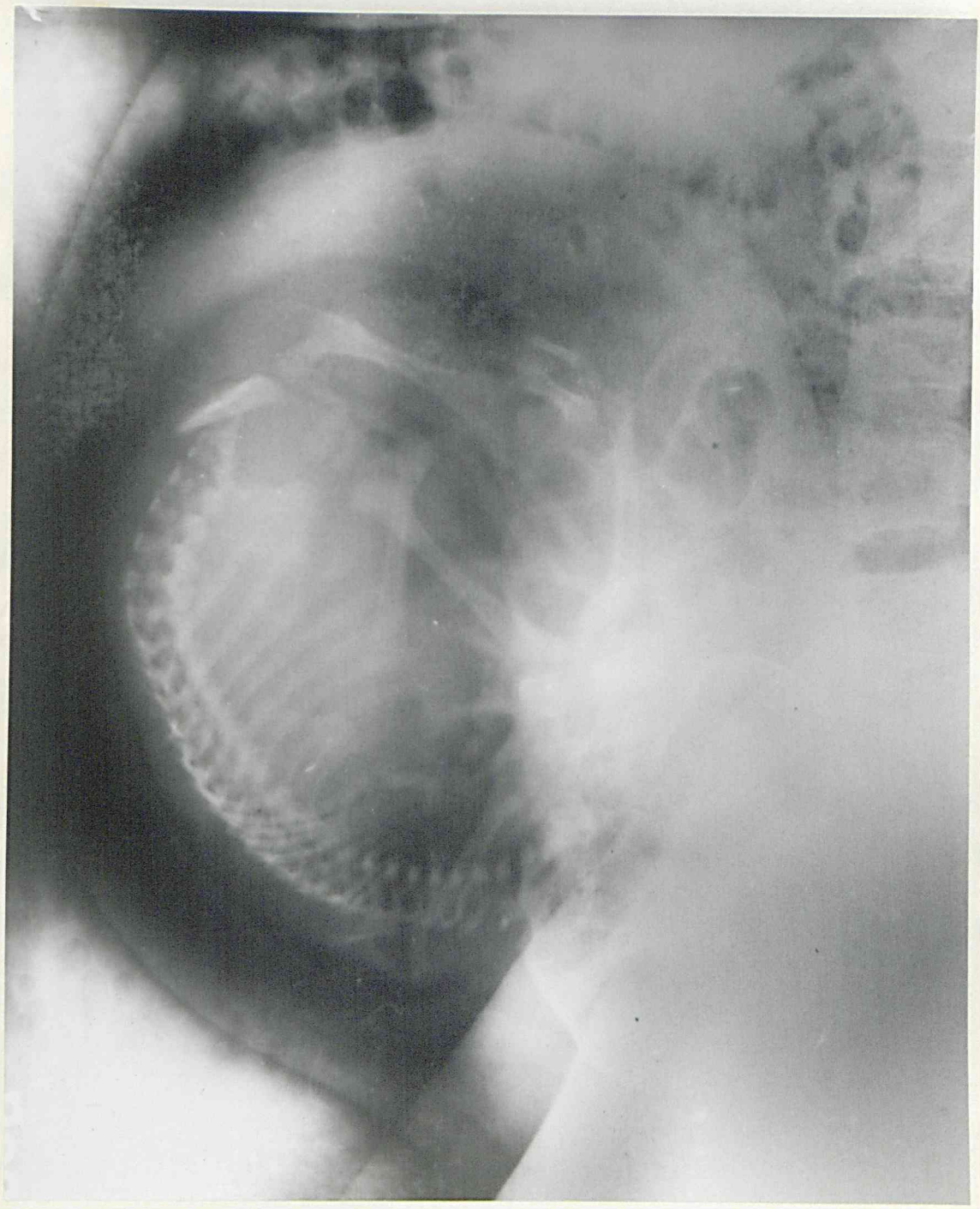


Figure 25. Soft tissue radiography - the lateral radiograph of the abdomen. Posterior implantation of the placenta in the upper uterine segment shown as a unilateral thickening of the soft tissue shadow of the uterus. (Case No. 24).

Figure 26. Soft tissue radiography - the lateral radiograph of the abdomen. Posterior implantation of the placenta in the upper uterine segment shown as a unilateral thickening of the soft tissue shadow of the uterus. (Case No. 215).

Figure 27. Soft tissue radiography - the lateral radiograph of the abdomen. Posterior implantation of the placenta in the upper uterine segment shown as a unilateral thickening of the soft tissue shadow of the uterus. (Case No. 110).

be indistinguishable. This agrees with the experimental work of Chassar Moir and with the findings of Reid (1949). Amniography helps to confirm this and further confirmation that the placenta is at the site of the thickening has been obtained visually at Caesarean section, by vaginal palpation at delivery, and by retrograde injection of the cord vessels during the third stage of labour.

The remainder of the homogeneous soft tissue shadow appears as a band approximately of equal depth, between the black line and the outer border of the uterus. This represents uterine wall and liquor, and amniography helps to confirm this. Minor thickenings in the band correspond to collections of liquor (Chassar Moir); this also is seen on amniography. The so-called "depressions" in the placenta produced by limbs are in fact the reverse, and are due to collections of liquor. The placenta is normally surrounded on its foetal aspect by a thickness of liquor and thus presents a shadow of fairly even thickness. When a limb displaces some of this liquor, the appearance of a pressure defect is produced.

Although the foetus is normally to some extent mobile within the uterus, and the liquor circulates freely and may collect at any point, the effect of gravity and repetition of films at various intervals does not produce any material change in the radiographic picture. Radiography with the patient prone, supine or erect gives almost exactly the same appearances providing the lateral projection is maintained. This is in agreement with the finding of Torpin and Holmes in 1943 and Reid in 1949. Minor alterations in the foetal attitude occur, and with them minor alterations in the soft tissue outlines, but the diagnostic features remain unchanged.

Mensuration of the Soft Tissue Shadows.

Mensuration is likely to produce somewhat confusing results for the following reasons:-

(1).

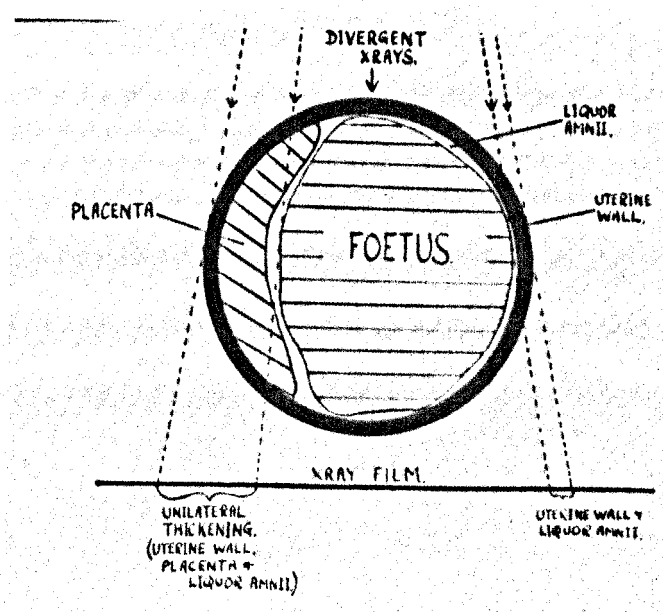



Figure 28.

As shown, the soft tissues which are producing the radiographic images are some distance from the x-ray film during the radiographic exposure. By the Theory of Similar Triangles magnification therefore takes place, can be calculated, and a correction made for it.

(2).

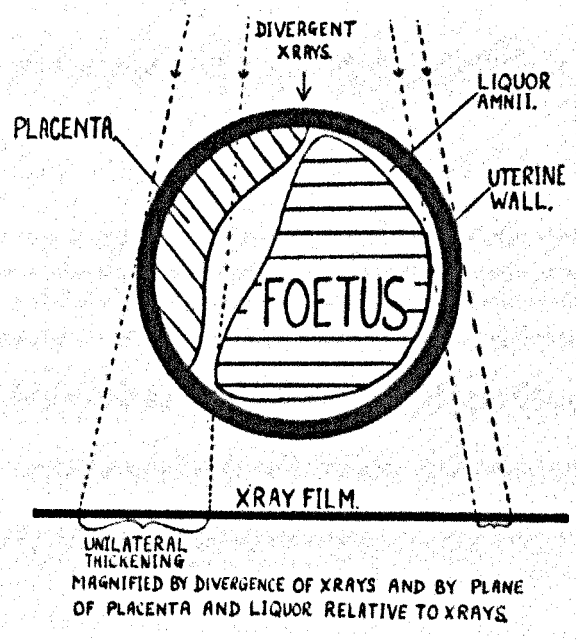



Figure 29.

This shows that projection of the soft tissue shadows radiographically, may increase the magnification because of the plane in which they lie relative to the x-rays.

The measurements are therefore not, in all cases, an accurate representation of the relative dimensions of the soft tissues they represent. In Table 2 the measurements given relate to 108 cases, and are corrected for magnification. All are from cases at or near term.

TABLE 2

| | Greatest cms. | Least cms. | Mean cms. | Average cms. |
|---|---|---|---|---|
| Thickness uterine wall, placenta and liquor. | 5.8 | 3.1 | 4.4 | 4.1 |
| Thickness uterine wall and liquor. | 1.3 | 0.5 | 0.8 | 0.9 |
| Assuming even distribution of liquor. Thickness placenta only. | 4.5 | 2.6 | 3.6 | 3.2 |

The length of the placental shadow is more difficult to measure especially posteriorly, but has been found to be usually between 20 and 26 cms. and to average 23 cms.

The cases in which the placenta showed calcification have also been measured. These showed that the placenta averaged 3.4 cms. in thickness and 22.5 cms. in length.

By amniography it is possible to measure the thickness of the uterine wall alone. In those cases measured the average thickness of the lower uterine segment was found to be 0.4 cms. whilst the upper uterine segment averaged 0.5 cms. in thickness. All these cases were at or near term.

Difficulties in Interpretation of the Lateral Radiograph of the Abdomen.

These can be divided into three main groups, as follows:-

(A). Anatomical Factors.

1). Lateral Placenta.

If the placenta is implanted laterally so that its main bulk is not incident to the

x-rays, then the lateral radiograph of the abdomen will show no demonstrable thickening.

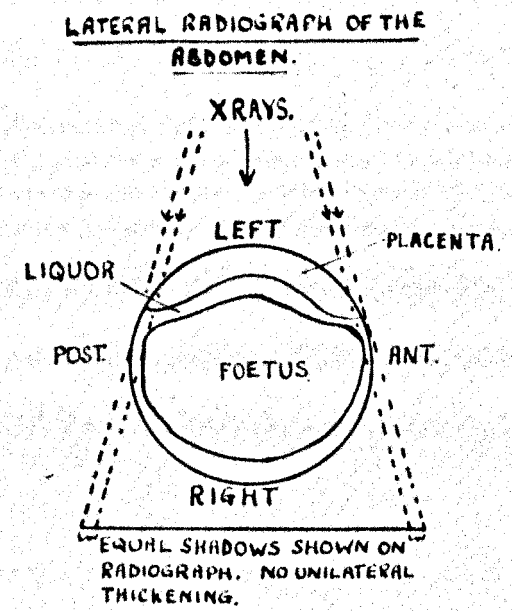



Figure 30.

The diagram illustrates how this effect is produced, and an example of such a radiograph is shown in Figure 31. However, in such a case one oblique radiograph produces the diagnostic thickening of the soft tissue shadow, while the other oblique film shows the same findings as the lateral view. But the results both in this series and in reports in the literature suggest that entirely lateral implantation of the placenta occurs relatively infrequently.

2). Obliquity of the Uterus.

Rotation of the uterus, more commonly to the right, is frequently found in the pregnant uterus at or near term. If of severe degree it is possible that a

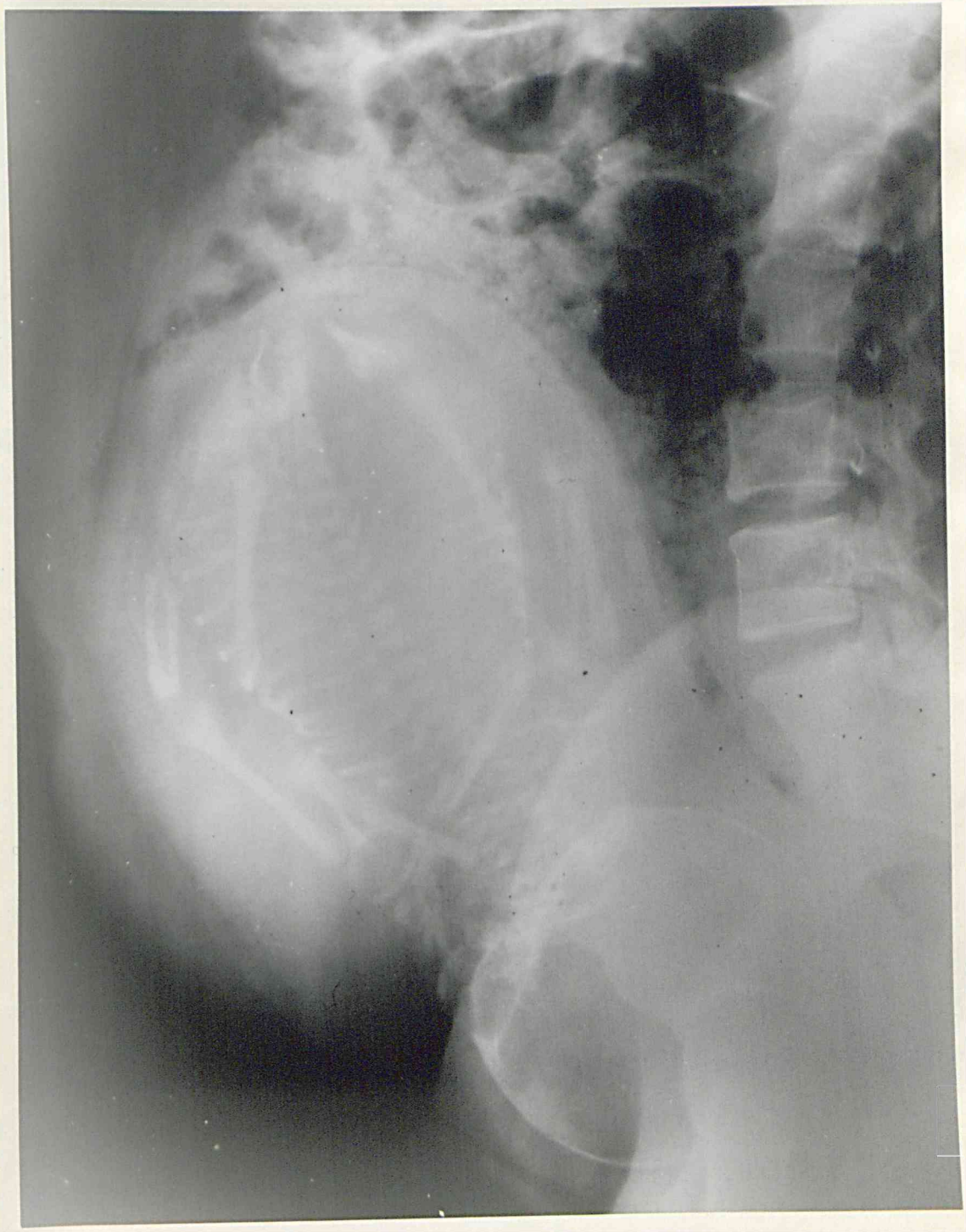


Figure 31. The lateral radiograph of the abdomen in a case of implantation of the placenta on a lateral wall of the upper uterine segment. There is no diagnostic unilateral thickening of the soft tissue shadow. Oblique radipgraphs in this case demonstrated the site of the placenta. (Case No. 163).

placenta thought to be implanted either anteriorly or posteriorly, might in fact be principally on the lateral uterine wall. Experience in this series has not shown that any appreciable error arises in this way. Clinical confirmation of the radiological findings suggests that such a marked degree of torsion does not commonly upset the anatomical relationships sufficiently to cause erroneous interpretation.

(B). Pathological Abnormalities.

1). Placental.

These could affect diagnosis in a number of ways. The placenta could be membranaceous and cover a wide area of the uterus. Such a placenta might be so thin that no diagnostic thickening of the soft tissue shadows would be produced. Often an accessory lobe of the placenta might not be visualised. If such a lobe were situated in the lower segment of the uterus but was not visualised the other diagnostic features described under placenta praevia would still be present. Only one such case has been seen and it produced both characteristic thickening of the lower uterine segment and displacement of the presenting foetal head (Case No. 70).

2). Hydramnios.

In 1939 Weintraub and Snow recognised that hydramnios might give rise to difficulty in the interpretation of the soft tissue method of radiography of the placental site. This is because uterus, placenta and liquor are of equal radiographic density, and thus excess of liquor may increase the thickness of the soft tissue shadows considerably. In addition the increase in girth of the patient decreases radiographic definition by the production of additional

Figure 32. The lateral radiograph of the abdomen in a case of hydramnios. Marked thickening of the soft tissue shadows, but the additional thickness on the anterior uterine wall is sufficient for diagnosis of anterior implantation of the placenta. (Case No. 111).

Figure 33. Lateral radiograph of the abdomen in a case of transverse lie. The unilateral thickening shows that the placenta is anterior. (Case No. 393).

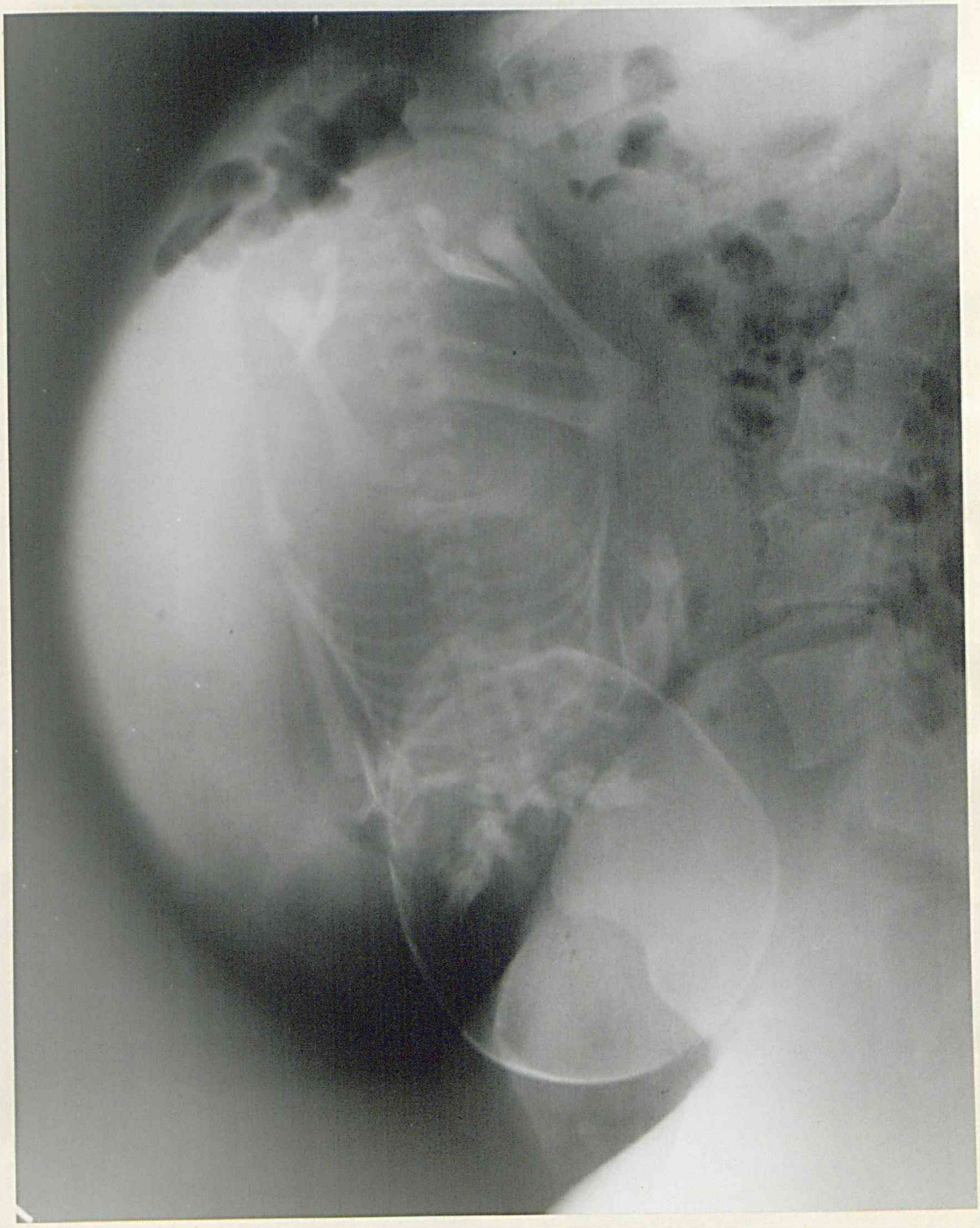


Figure 34. The same case as Figure 33, following spontaneous version to a head presentation. The unilateral thickening again demonstrates an anterior placenta.

Figure 35. The same case as Figures 33 and 34. The erect lateral shows the head partly engaged transversely. Normal anterior and posterior "band-like" shadows exclude placenta praevia.

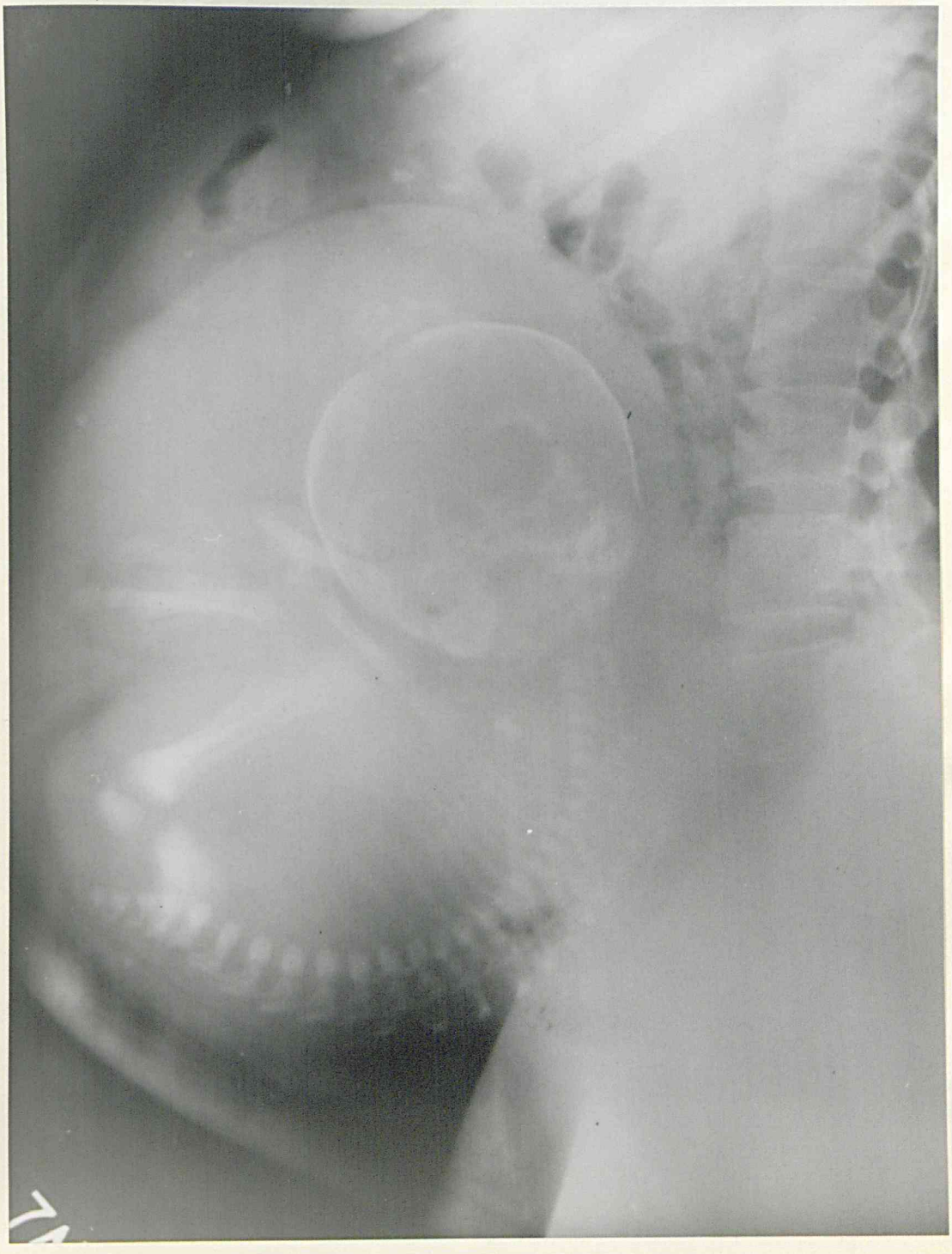


Figure 36. Lateral radiograph of the abdomen in a case of transverse lie. The placenta is shown in the fundus of the uterus as a thickening of the soft tissue shadows (Case No. 221).

Figure 37. Lateral radiograph of the abdomen in a case of oblique lie. The placenta is shown mainly in the fundus. (Recent case. Normal vaginal delivery).

secondary radiation. Hydramnios may therefore:-

(a). Lower the quality of the radiograph.

(b). Increase the general thickness of the soft tissue shadows including both "placental" and "uterine wall" shadows beyond the point where a diagnostic thickening representing the placental site is apparent.

(c). Collect eccentrically so that there is no diagnostic thickening of the soft tissue shadow seen, or the thickening appears on the opposite side to the placenta.

In the majority of cases examined the excess of liquor has been evenly distributed, but the additional thickness on the side on which the placenta is present, has been sufficient for diagnosis. An example is shown in Figure 32.

(C). Miscellaneous.

1). Multiple Pregnancy.

In these cases the definite thickening of the soft tissue shadow representing placental site is much less frequently seen because the common association of hydramnios and the increased girth of the patient both militate against radiographs of good quality. Yet large "placental shadows" are often seen, and occasionally two "placental shadows" may be apparent.

No case of placenta praevia in multiple pregnancy was seen in this series.

2). Transverse and Oblique Lie.

The placental site can be recognised in this type of presentation. Illustrations are shown in Figures 33 to 37. Transverse and oblique lie are discussed in detail in Chapter 8.

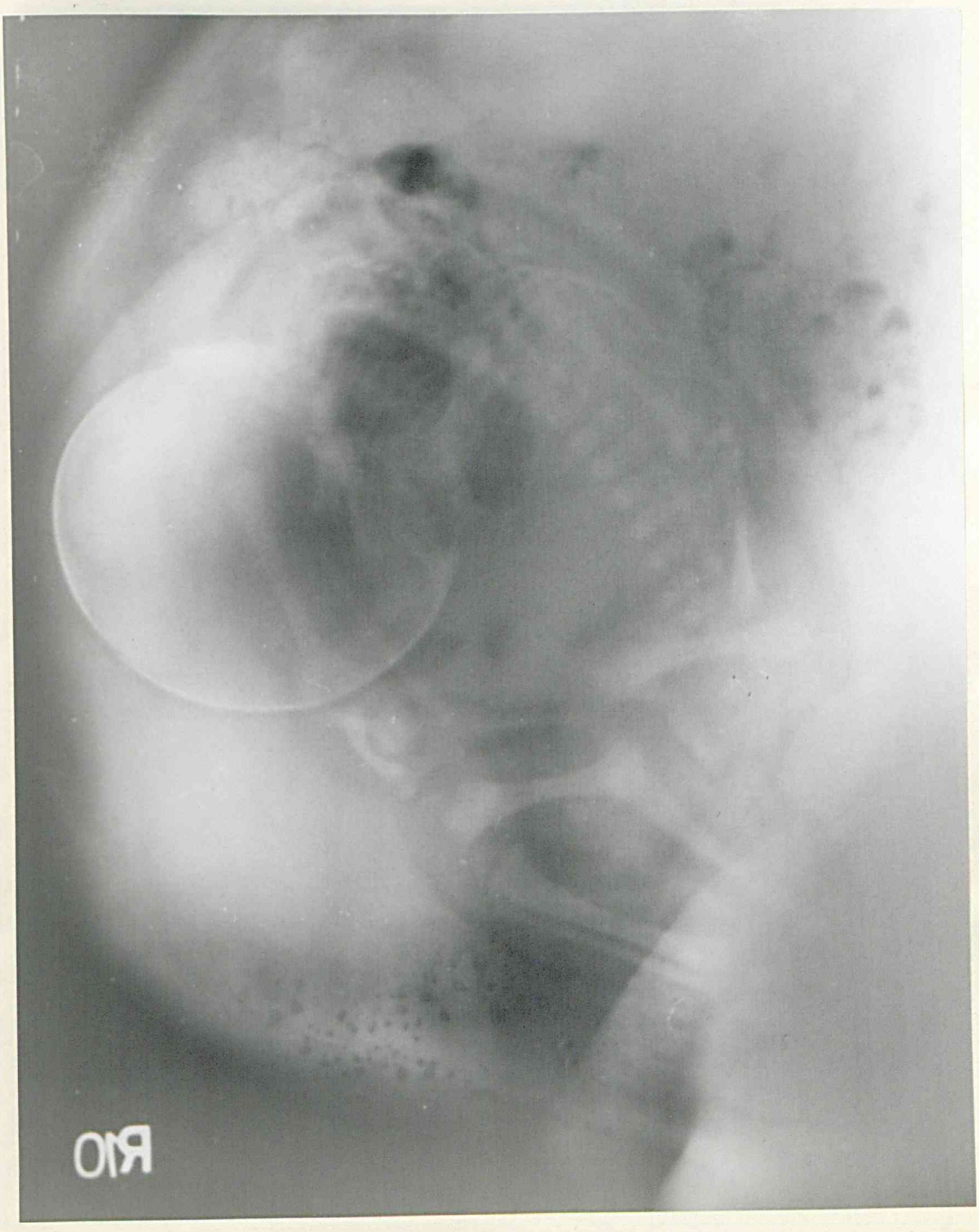


Figure 38. Lateral radiograph of the abdomen in a case of breech presentation. The unilateral thickening corresponding to the placenta is on the anterior wall of the upper uterine segment. (Case No. 211).

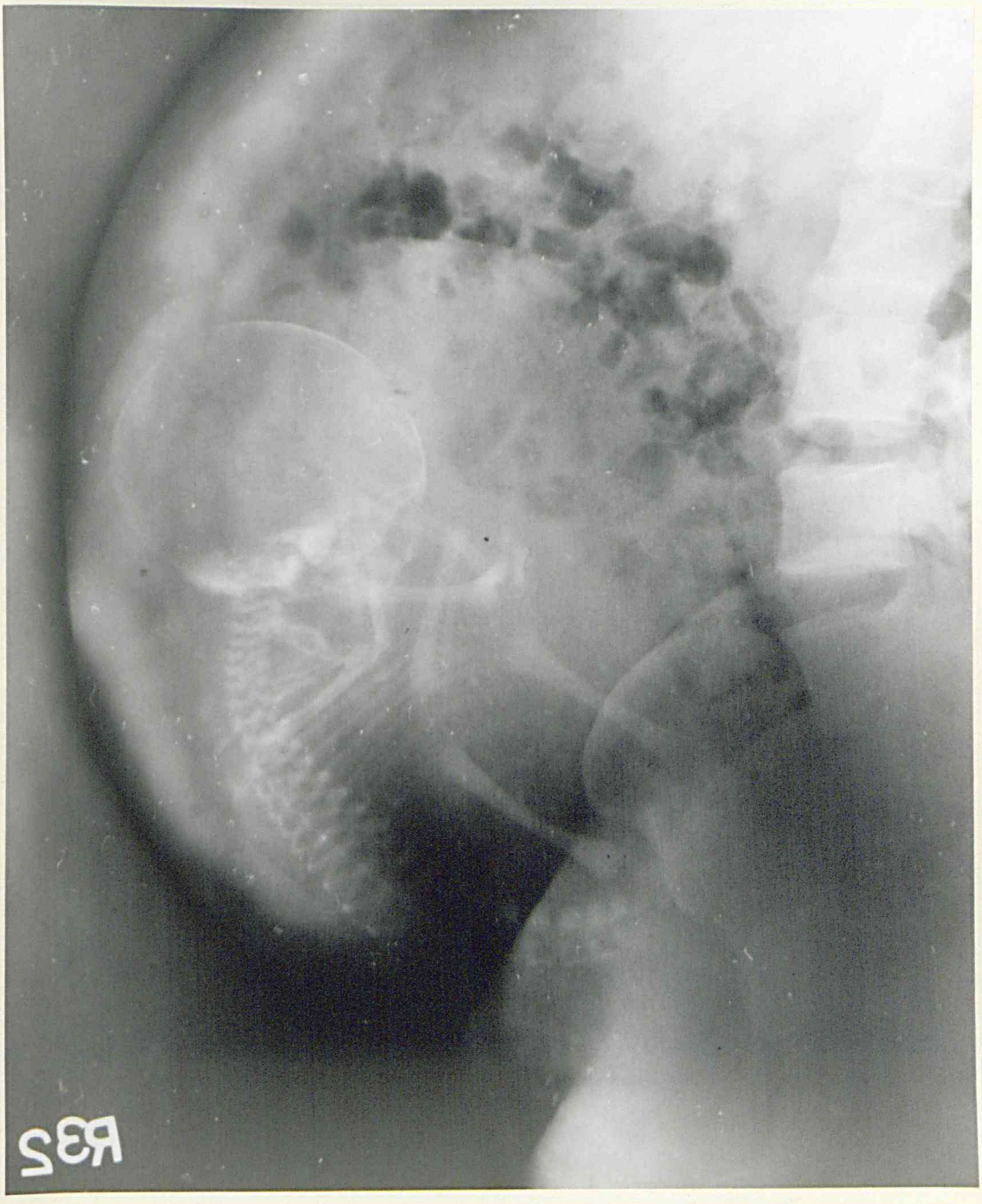



Figure 39. Lateral radiograph of the abdomen in a breech presentation. The unilateral thickening corresponding to the placenta is on the posterior wall of the upper uterine segment. (Case No. 90).

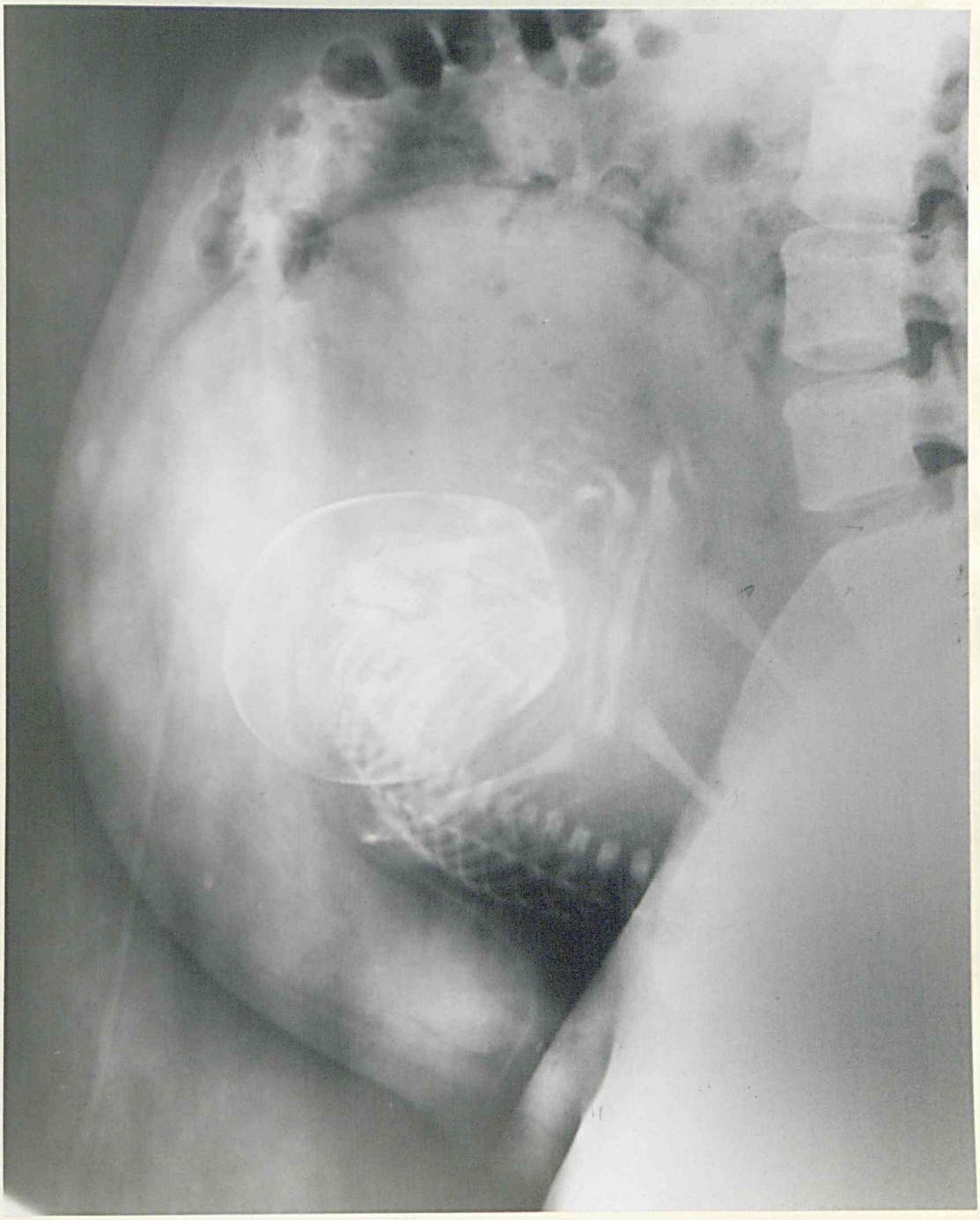


Figure 40. Lateral radiograph of the abdomen in a breech presentation. The unilateral thickening corresponding to the placenta is on the fundus of the uterus. (Case No. 99).

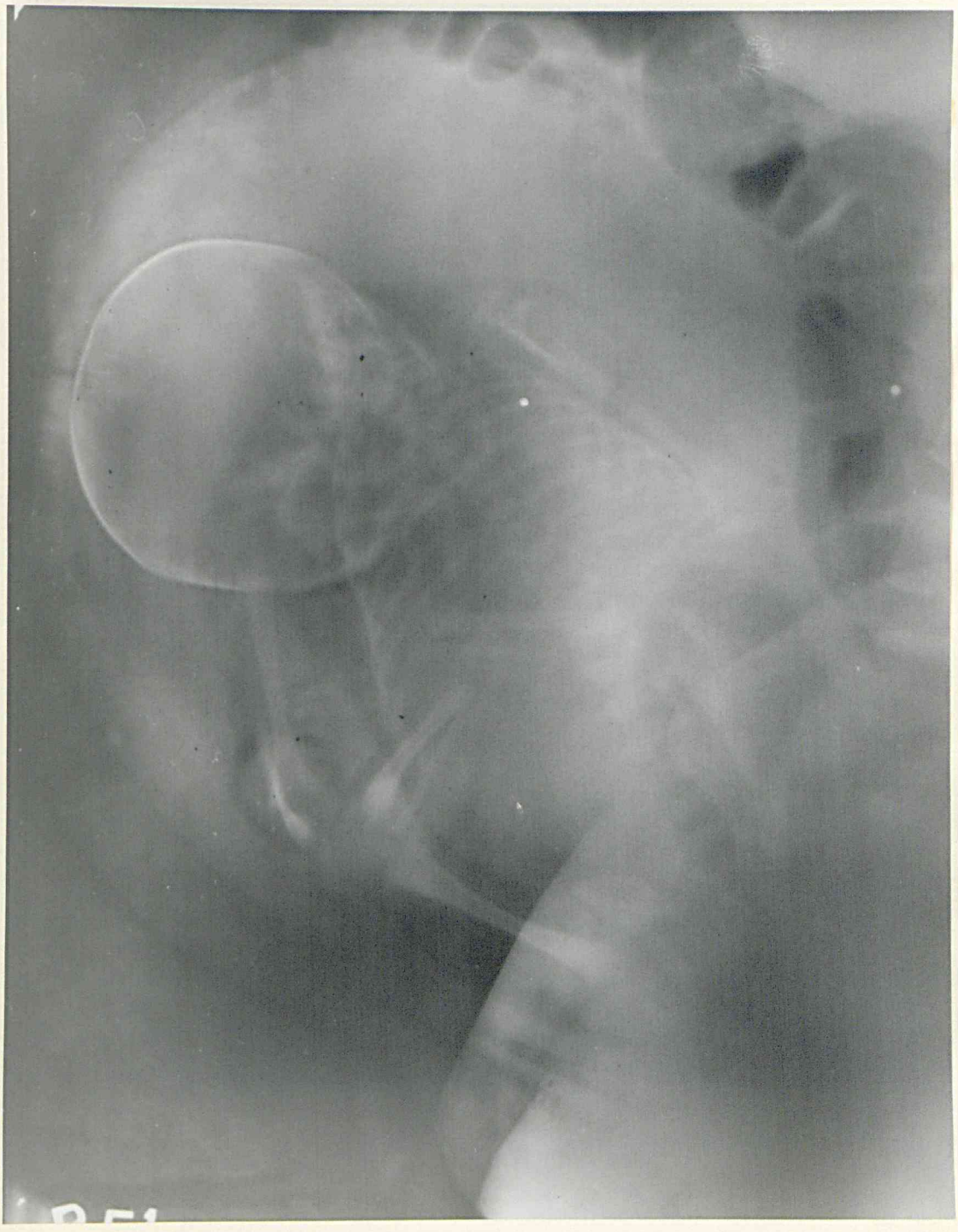


Figure 41. Lateral radiograph of the abdomen in a breech presentation. Fundal cornual appearance due to implantation of the placenta over a cornu of the uterus. (Case No. 35).

3). Breech presentation.

Many authors have found difficulty in interpreting the soft tissue shadows in this presentation.

Reid in 1949 related this to the tendency for the foetus to fit less closely into the upper uterine cavity in breech presentation. Consequently the foetal head in the fundus might be surrounded by a relatively greater quantity of liquor than surrounds the breech in vertex presentations. This excess of liquor would mask the placental site, since it has the same radiographic density as placenta. Early in this series it was recognised that in breech presentations there are three groups of radiographic appearances:-

(a) Normal anterior or posterior "placental" shadow (Figures 38 and 39).

(b) Appearances of "placental" shadow in fundus (Figure 40).

(b) Appearance of no definite "placental" shadow, but that the foetal head in the fundus is "superimposed" on the placental shadow (Figure 41).

The last type would illustrate Reid's argument, but could also be explained by an implantation of the placenta over one cornu of the uterus, which has been called in this series "fundal cornual" placenta. Several cases of this type have been confirmed by amniography, on Caesarean section, vaginally, or by the presence of calcification in the placenta.

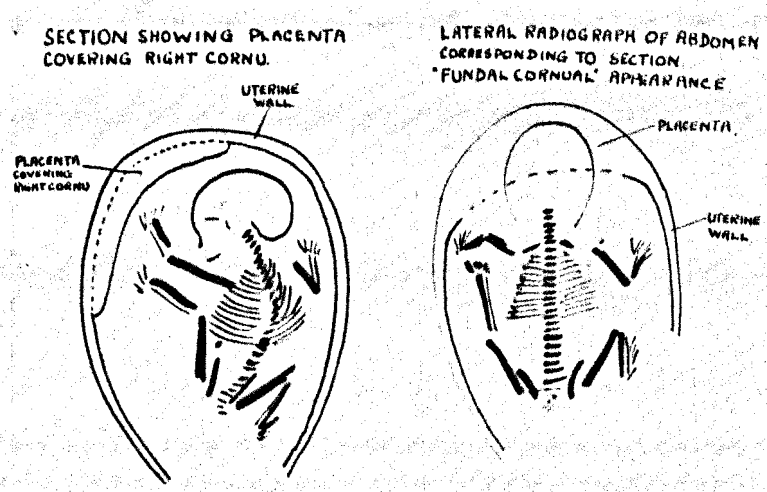
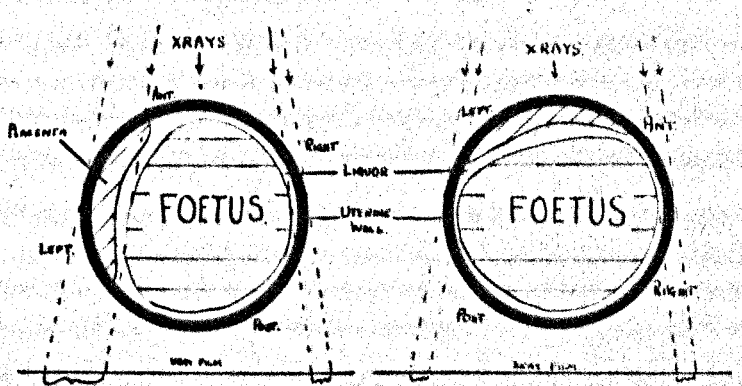



Figure 42.

Figure 42 illustrates the suggested mode of production of this appearance.

Oblique Radiographs of the Abdomen.

These views are used to demonstrate the placenta when it is located on the lateral walls of the uterus.




LEFT OBLIQUE RADIOGRAPH SHOWS UNILATERAL THICKENING, THE RIGHT FILM SHOWS EQUAL SHADOWS ON BOTH SIDES.

Figure 43.


Figure 44. Antero-posterior view of the abdomen after amniography using 30 ml. of 70% Vasiodone. The placental site is difficult to identify in this view since the placenta was located posteriorly. This is the same case as Figure 1. (Case No. 252).

The diagrams in Figure 43 show the way in which these projections outline the laterally implanted placenta.

Interpretation of these films is similar to that for the lateral radiograph of the abdomen.

Recognition of the characteristic thickening of the soft tissue shadows corresponding to the placental site is readily made. Because of the projection, distortion magnification of the soft tissue shadows is pronounced, and the "placental thickening" appears very wide. The side of the radiograph corresponding to each lateral wall can be determined.

Antero-Posterior and Postero-Anterior Radiographs of the Abdomen.

In this series, except where calcification of the placenta was present, it was not possible to identify the placental site with precision from these radiographs. This is contrary to the findings of Snow, Stevenson and others.

According to most reports, the placental site is situated on the anterior or posterior wall in a very high percentage of cases. In these circumstances antero-posterior and postero-anterior projection of the uterus would not be expected to reveal a characteristic thickening of the soft tissue shadows corresponding to the placental site.

Confirmation of this point is possible in two ways. Firstly, amniography shows that in some cases (Figure 44) antero-posterior or postero-anterior projection does not reveal a definite placental site, recognisable by its filling defect. Secondly when the placental site, revealed by calcification, is demonstrated on other views to be on the anterior or posterior wall, that site usually cannot be recognised in the antero-posterior or postero-anterior projection. Where the calcified placenta spreads

onto a lateral uterine wall, its shadow is frequently on the opposite side to that showing the greater thickening of the soft tissue shadow, in the antero-posterior or postero-anterior view.

Moreover, because of the superimposition of the outline of the uterus on all the shadows of the posterior abdominal wall, the soft tissue shadows are in general less well defined and interpretation is difficult even in lateral implantation of the placenta.

Study of published radiographs and those of the present series suggests that location of the placenta in these views may have been made primarily because of the relationship of the foetus to the placental site. Snow and Rosensohn (1939), Buxton, Hunt and Potter (1942), Smith (1943), Torpin and Holmes (1943), Bishop (1945) and Reid (1949) all commented that the placenta was frequently opposite the ventral surface of the foetus. It seems therefore that the placenta has been located as opposite to the ventral surface of the foetus, because of this relationship.

Dippel and Brown in 1940, found that the foetus did not necessarily face the placenta and this has been confirmed in the present series. In the majority of 281 cases assessed the ventral surface of the foetus was not found opposite to the placenta.

For these reasons therefore it has not been possible to identify the placental site with certainty from antero-posterior or postero-anterior radiographs of the abdomen.

The Erect Lateral Radiograph of the Pelvis.

The bony outlines seen in this view are readily recognised. The symphysis pubis anteriorly and the lumbar spine, sacrum and coccyx posteriorly form the anterior and

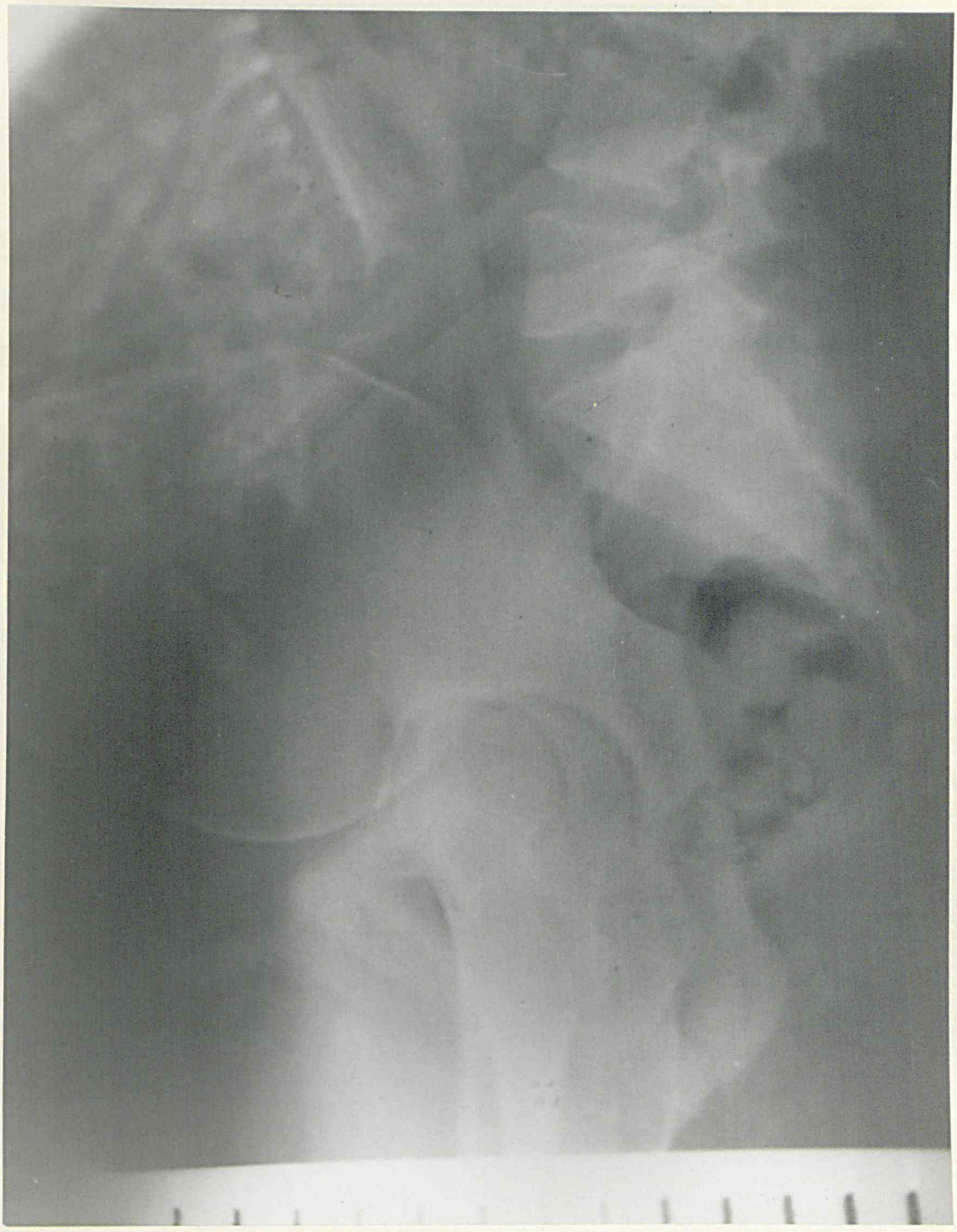


Figure 45. Erect lateral radiograph of the pelvis. The posterior "band-like" shadow is very well defined, but the thicker anterior "band-like" shadow is much less clearly seen. (Case No. 244).

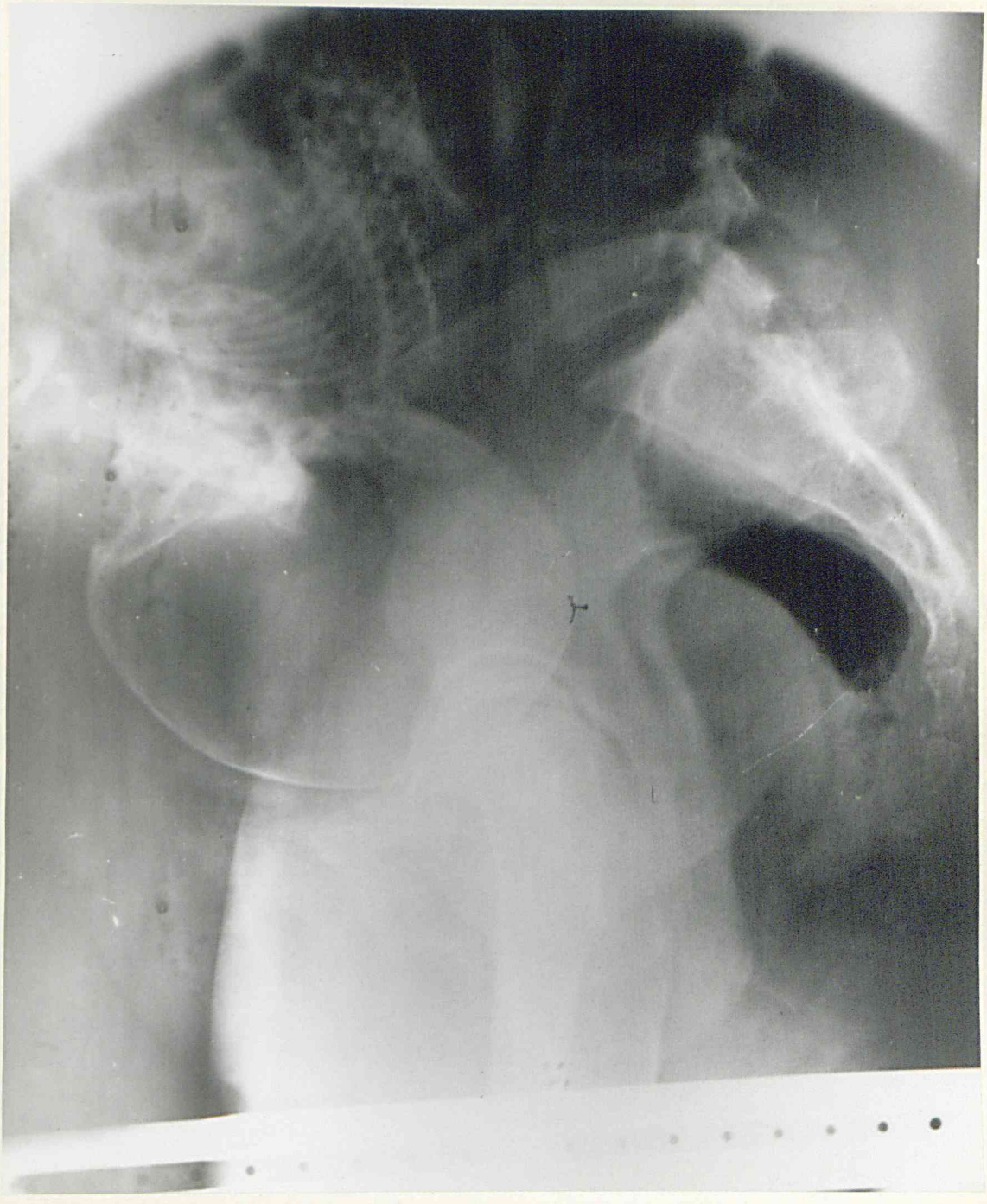


Figure 46. Erect lateral view of the pelvis. The anterior "band-like" shadow is more clearly shown than in Figure 45 because there is less liquor anteriorly and hence a thinner shadow. (Case No. 274).

posterior boundaries of the pelvis. Within these borders, somewhat obscured by the side walls of the pelvis, are the relevant soft tissue shadows of the uterus, and the outline and bony parts of the presenting foetal part.

The pelvic inlet, formed by the postero-superior part of the symphysis pubis in front and the sacral promontory behind, usually contains the presenting foetal part. Normally this part is symmetrically placed within the inlet, a relationship best seen in head presentations.

In the maternal pelvis at or near term, if the radiographs are of high quality, the periphery of the soft tissue shadow of the uterus is clearly visualized posteriorly. It is best seen above the sacral promontory but can be recognised below this level for a variable distance, its image being less clear because of the superimposed bony pelvic side walls (Figure 45). Anteriorly the outer border of the soft tissue shadow of the uterus is less clearly visualized, especially where engagement is only just commencing. There appears to be in many cases a relatively greater volume of liquor anteriorly, and since the soft tissue shadow between the presenting part and the peripheral outline is made up of both the uterine wall and liquor, the thickness of the soft tissue shadow is greater anteriorly. This wider shadow is less clearly visualized and interpretation is more difficult (Figure 45). In those cases where there is not a greater quantity of liquor present anteriorly the anterior shadow is more clearly defined (Figure 46).

The soft tissue shadows therefore, consist of a well defined "band-like" shadow posteriorly, separated from the foetal skull in head presentations by only the thin translucent shadow of the subcutaneous tissues of its scalp. Posteriorly the shadow of the uterus has a clearly defined

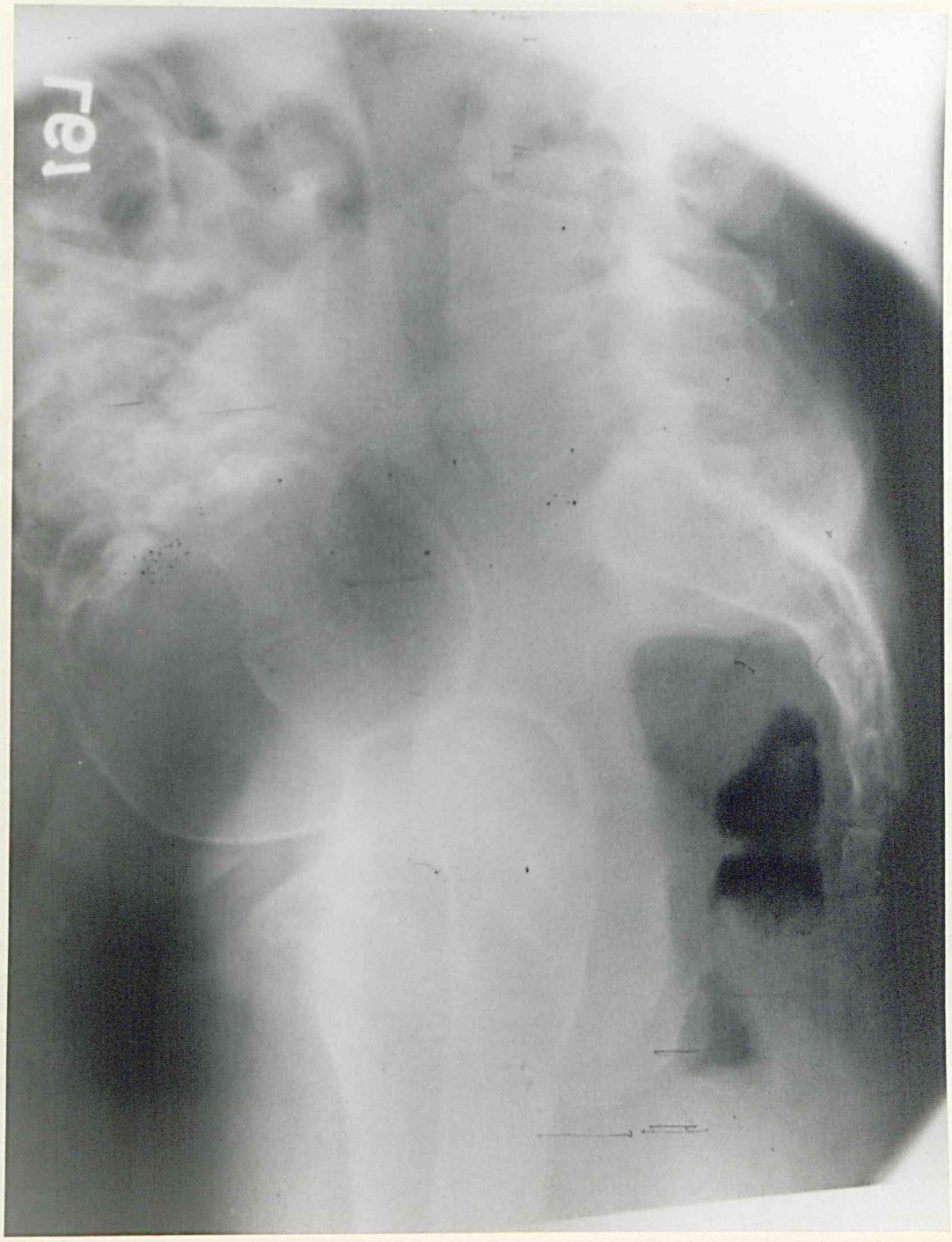


Figure 47. Erect lateral radiograph of the pelvis after amniography with 30 ml. of 70% Vasiodone. There is a greater amount of liquor anteriorly and the liquor is separated from the foetal skull by a black line due to the translucency of the subcutaneous tissues of its scalp. The film also shows how very thin the uterine wall is between the foetal head and the symphysis and promontory. (Case No. 290).

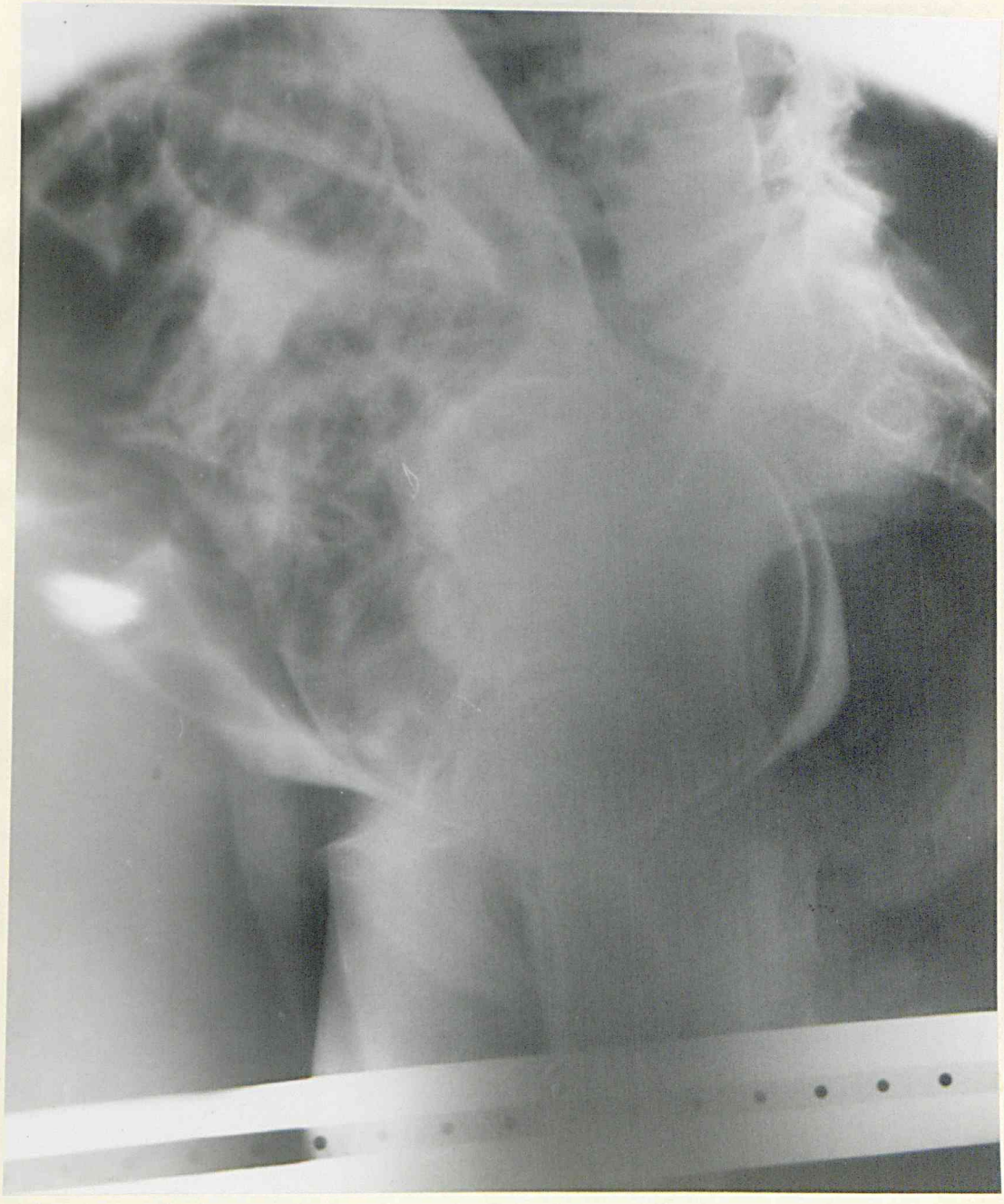


Figure 48. Erect lateral view of the pelvis after amniography. The head is almost fully engaged transversely. The liquor is evenly distributed around the head both anteriorly and posteriorly. (Case No. 254).

border lying close to the lumbar spine and upper segments of the sacrum. This "band-like" shadow is normally very thin, averaging 4 mm. in thickness. As shown later the junction of the upper and lower uterine segments posteriorly, is usually below the sacral promontory. Posteriorly there is usually only a small depth of liquor. Amniography confirms this (Figure 47).

Anteriorly the soft tissue shadows are less well defined, but above the level of the symphysis pubis can be seen the outer border of the uterine outline, lying below the tissues of the anterior abdominal wall. This outline may be seen below the level of the symphysis, but the finding is variable and cannot be relied on for diagnosis. Between the periphery of the uterine outline and the foetal skull in head presentations is also formed anteriorly a"band-like" soft tissue shadow, frequently thicker than the posterior shadow. This shadow in a similar way to the posterior shadow is made up of uterine wall and liquor. Above the level of the symphysis pubis before the lower uterine segment has been "taken up" the shadow represents upper uterine segment, as will be shown later.

Amniography confirms this situation and shows the relatively larger quantity of liquor present anteriorly in many cases (Figure 47).

When the presenting part is fully, or almost fully engaged the distribution of liquor is more even. Amniography confirms this and also shows the extreme thinning of the uterine wall between the foetal skull and the sacral promontory posteriorly and the symphysis pubis anteriorly (Figure 48). The liquor is shown separated from the foetal skull by the black line representing the relatively translucent sub-cutaneous fat of the foetal scalp.

In breech presentation visualization of both the soft tissue shadows representing uterus and liquor, and of the soft parts of the breech is more difficult. The clearly differentiated foetal skull, with its surrounding black line of subcutaneous tissue, is replaced by the much less well defined and regular breech. Whilst the periphery of the uterine shadow remains relatively clear the inner border of the "band-like" shadow normally defined by the black line around the foetal skull is not present. The breech, with or without flexed legs, is only partly outlined and is poorly defined, because of the irregular shape of the breech, the black line is irregular and not well visualized.

However, in breech as in head presentations the presenting part tends to be symmetrically placed in the pelvic inlet. This has also been noted by Golden and Ball in 1941 and Reid (1949).

In transverse and oblique presentations, or in very high position of the presenting part, only the peripheral outlines of the soft tissue shadow of the uterus remain to be seen in the erect lateral film. Within these boundaries the soft tissue shadow is homogeneous.

In the early months of pregnancy, the soft tissue shadows are seldom visualized, and the presenting part is frequently central and fully engaged, even in the presence of displacing factors which will later prevent central and full engagement.

Forward and backward inclination of the patient during the erect lateral radiograph have not been found to produce any marked change in the position of the presenting part in the pelvic inlet.

TABLE 3

| Number (1) | Case No. (2) | Patients' Initials (3) | Parity (4) | Age (5) | Maturity by dates when x-rayed (weeks) (6) | Interval in weeks x-ray to delivery (7) | Birth Weight Baby lbs. ozs. (8) | Presentation on x-ray (9) | X-ray Findings: Location of Placenta (10) | X-ray Findings: Other Findings | A.P.H. (11) | Mode of Delivery (12) | Clinical Findings (13) | Confirmation of Placental Site (14) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3 | G.R. | M.6 | 33 | 39 | 5 | | T | Anterior | | - | | Trans.lie ? cause | |
| | | | | | 40 | 5 | 7 15 | H | Anterior | | - | N.D. | Sp. version | |
| 2 | 4 | M.L. | M.2 | 27 | 34 | 5 | 8 10 | H | Anterior | | - | N.D. | High head | Vaginally |
| 3 | 5 | L.M. | M.2 | 33 | 34 | 7 | 7 3 | H | Anterior | | + | N.D. | A.P.H.-Cause not found | |
| 4 | 6 | N.K. | P | 36 | 40 | 2 | 6 7 | H | Posterior | | - | C.S. | Elderly primipara | At C.S. |
| 5 | 7 | E.J. | M.2 | 29 | ?33 | 0 | 4 4 | B(F) | Fundal cornual. Larger element post. | | + | B.D. | A.P.H.-Cause not found | At M.R. |
| 6 | 8 | W.F. | P | 32 | ?34 | 9 | | B($\frac{1}{2}$E) | "Normal" posterior | | - | | Sp. version | |
| | | | | | 37 | 4 | 7 5 | H | Posterior | | - | C.S. | I.U.A. | At C.S. |
| 7 | 9 | B.S. | M.2 | 32 | 37 | 2 | | B(E) | "Normal anterior | | - | | ? oblique lie | |
| | | | | | 39 | 0 | 8 5 | H | Anterior | | - | N.D. | Sp. version | |
| 8 | 10 | G.B. | P | 36 | 38 | 0 | 6 5 | H | Anterior. F.A. not diagnosed | | - | C.S. | Outlet contractn. | At C.S. |
| 9 | 12 | A.O. | M.2 | 29 | 35 | 7 | | H | Erect lateral only. High head, soft tissues not seen | | | | Meningo-encephalocele | |
| | | | | | 41 | 2 | 9 2 | H | Anterior | | - | N.D. | Oblique lie | Vaginally |
| 10 | 13 | R.A. | P | 19 | 36 | 5 | 6 4 | H | Anterior | | - | L.F. | | |
| 11 | 14 | C.M. | M.5 | 24 | 40 | 2 | 7 9 | H | Anterior & on L. lateral wall | | - | N.D. | Oblique lie | |
| 12 | 16 | S.T. | M.2 | 24 | 38 | | | H | Anterior | | | | Not known | |
| 13 | 17 | L.J. | P | 21 | 40 | 2 | 8 11 | H | Posterior | | - | N.D. | Unstable lie | |
| 14 | 18 | C.S. | M.5 | 37 | 40 | 5 | 8 15 | H | Anterior | | - | N.D. | | |
| 15 | 20 | H.F. | P | 21 | 38 | 0 | 9 1 | H | Anterior | | - | N.D. | | |
| 16 | 21 | A.G. | M.2 | 30 | 37 | 7 | 8 9 | H | Posterior | | - | N.D. | High head | |
| 17 | 22 | D.C. | P | 24 | 37 | 3 | | H | Anterior. High central head. Full bladder & rectum | | - | | High head | |
| | | | | | 38 | 2 | 7 8 | H | Anterior. Central full engagement | | - | N.D. | | |
| 18 | 23 | M.B. | M.4 | 31 | 38 | 2 | 7 2 | H | Anterior | | - | N.D. | | |
| 19 | 24 | D.H. | P | 20 | 38 | 2 | 7 6 | H | Posterior | | - | N.D. | High head | |
| 20 | 25 | C.K. | P | 23 | 36 | 3 | 8 4 | H | Posterior | | - | L.F. | Unstable lie | Vaginally |
| 21 | 26 | M.B. | M.2 | 37 | 37 | 4 | 7 13 | H | Anterior | | - | F | Unstable lie | Vaginally |
| 22 | 27 | M.A. | M.3 | 37 | ? | 0 | 7 15 | H | Posterior | | - | F | | Vaginally |
| 23 | 28 | M.J. | M.4 | 26 | 37 | 4 | | H | Anterior | | - | | (found | |
| | | | | | 38 | 3 | 5 5 | H | Anterior | | + | N.D. | A.P.H. Cause not | |
| 24 | 30 | C.T. | P | 22 | 39 | 1 | | B(E) | Fundal cornual. Larger element post. | | | | | |
| | | | | | 40 | 0 | 4 12 | B(E) | Fundal cornual. larger element post. | | - | B.D. | (found | At M.R. |
| 25 | 31 | M.F. | M.9 | 37 | 30 | 8 | 5 12 | H | Anterior | | + | N.D. | A.P.H. Cause not | |
| 26 | 32 | F.W. | M.6 | 36 | 38 | 1 | 7 14 | H | Anterior | | + | N.D. | Delivered elsewhere | |
| 27 | 33 | F.P. | P | 22 | 40 | 0 | 6 5 | H | Anterior | | - | N.D. | High free head | |
| 28 | 34 | R.F. | M.3 | 27 | 33 | 12 | 6 5 | H | Anterior | | + | N.D. | Repeated A.P.H. Cause not found | |
| 29 | 35 | E.D. | M.10 | 43 | 37 | 2 | 8 0 | B(E) | Fundal cornual | | - | N.D. | Ext. version | |
| 30 | 36 | H.H. | M.9 | 41 | 31 | 6 | 8 0 | T | Posterior | | - | N.D. | Trans.lie. Sp.vers. | |
| 31 | 37 | A.N. | M.2 | 30 | 29 | 10 | 7 &7 | Tw | Ant. & post. placental thickenings | | - | N.D. ofTw. | Binovular Tw. | |
| 32 | 38 | M.N. | P | 26 | 32 | 10 | 9 0 | H | Posterior | | + | F | (found A.P.H. Cause not | |
| 33 | 39 | M.S. | P | 21 | 30 | 9 | 6 8 | H | Posterior | | + | N.D. | A.P.H. Cause not (found | |
| 34 | 40 | R.C. | M.2 | 24 | 35 | 3 | 7 0 | H | Posterior | | - | F | Prominent high head | |
| 35 | 41 | I.G. | M.2 | 31 | 35 | 5 | 8 3 | H | Posterior | | - | N.D. | Head free | |
| 36 | 42 | V.T. | M.2 | 30 | 34 | 6 | - &6 | Tw | Oncoming foetus anencephalic. No recognisable placental site | | - | N.D. ofTw. | (found | |
| 37 | 43 | B.C. | M.4 | 35 | 36 | 3 | 6 6 | H | Posterior. Later films show I.U.D. | | + | I.U.D. | A.P.H. Cause not | |
| 38 | 44 | M.E. | P | 21 | 33 | 7 | 8 0 | H($\frac{1}{2}$E) | Posterior | | - | C.S. | Contracted pelvis | At C.S. |
| 39 | 45 | B.C. | M.3 | 23 | ?43 | 0 | 6 7 | H | Posterior (Amniography confirms) | | - | N.D. | Trans.lie - High head | Amniography |
| 40 | 46 | I.K. | M.2 | 34 | 37 | 2 | 8 7 | T | Anterior | | - | C.S. | Repeat for rickety pelvis | At C.S. |
| 41 | 48 | L.M. | M.4 | 28 | ?22 | 6 | 4 10 | H | Posterior | | + | N.D. | A.P.H. Cause not found | |
| 42 | 49 | E.B. | M.3 | 26 | 36 | 4 | 9 2 | H | Posterior | | + | N.D. | (found A.P.H. Cause not | |
| 43 | 50 | A.P. | M.4 | 32 | 36 | 5 | | H | Anterior ) Later. Erect lateral in | | - | | High head | |
| | | | | | 38 | 4 | 9 11 | H | Anterior ) labour of face presentn. | | - | C.S. | For face presn. | At C.S. |
| 44 | 51 | T.H. | P | 17 | 37 | 2 | 8 10 | H | Anterior | | - | F | Free high head | At M.R. |
| 45 | 52 | S.H. | M.3 | 29 | 37 | 1 | 8 10 | B(E) | Fundal cornual | | - | F | Ext. version | At M.R. |
| 46 | 53 | D.L. | M.4 | 26 | 36 | 4 | 6 6 | B(E) | Fundal cornual | | - | B.D. | (found | At M.R. |
| 47 | 54 | M.J. | M.2 | 19 | 37 | 7 | 3 14 | H | Anterior | | + | N.D. | A.P.H. Cause not | |
| 48 | 55 | E.T. | M.4 | 38 | 36 | 6 | 7 2 | H | Anterior | | - | N.D. | Oblique lie | |
| 49 | 56 | E.W. | M.2 | 36 | 39 | 2 | 8 7 | H | Anterior | | - | N.D. | | |
| 50 | 57 | A.M. | M.3 | 28 | 38 | 4 | 7 9 | B(E) | Fundal cornual | | - | N.D. | Ext. version | |
| 51 | 58 | R.W. | P | 23 | 39 | 3 | 6 15 | H | Mainly lateral (L) | | - | N.D. | Oblique lie | |
| 52 | 60 | M.E. | P | 22 | 36 | 6 | | H | Posterior. No erect lat. at this time | | | | High head | |
| | | | | | 41 | 1 | 5 12 | H | Posterior. Central full engagement | | - | N.D. | Persistent high head | |

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 53 | 62 | E.H. | M.6 | 30 | 32 | 2 | 3 2 | H | Anterior. Anencephalic foetus | - | N.D. | Hydramnios | |
| 54 | 64 | E.Q. | M.2 | 25 | 37 | 5 | | B(E) | Erect lat.only. Breech central and almost engaged | | | | |
| | | | | | 40 | 2 | 6 3 | H | "Normal" anterior | - | N.D. | Sp. version | |
| 55 | 66 | M.L. | M.2 | 33 | 25 | 12 | | T | Ant.probably not involving L.U.S. | + | | Cause A.P.H.not found | |
| | | | | | 33 | 5 | 8 6 | H | Anterior | - | | For confirmation | Vaginally |
| 56 | 67 | E.J. | M.4 | 25 | 34 | 6 | 8 15 | T | Anterior. No foetal parts related to symphysis or promontory | - | N.D. | Trans.lie ?Cause | |
| 57 | 68 | E.D. | P | 24 | 40 | 0 | 6 10 | H | Ant.& to (L).Marked calcification. Fig. 6. | - | N.D. | | Calcification |
| 58 | 69 | E.F. | P | 28 | 33 | 6 | 6 14 | H | Posterior | + | N.D. | (found Cause A.P.H.not | Vaginally |
| 59 | 71 | E.B. | P | 22 | 42 | 0 | 8 6 | H | Anterior (Films made in labour) | - | F | | |
| 60 | 72 | F.H. | M.8 | 31 | ? | 1 | 7 9 | H | Anterior | - | N.D. | Unstable lie | |
| 61 | 73 | M.E. | M.8 | 34 | 38 | 4 | 6 3 | H | Posterior | - | N.D. | Unstable lie | |
| 62 | 74 | E.H. | P | 25 | 38 | 4 | | B(F) | Fundal cornual | - | | Unstable lie | |
| | | | | | 41 | 2 | 8 7 | H | (Erect lateral only) | | N.D. | Spont.version | |
| 63 | 75 | N.O. | P | 19 | 39 | 1 | 4 12 | H | Anterior | ?+ | N.D. | ?? A.P.H. | |
| 64 | 76 | L.M. | M.2 | 25 | 40 | 0 | 8 4 | H | Fundal & Posterior. Fairly marked calcification | - | N.D. | High head | Calcification |
| 65 | 77 | E.F. | M.2 | 41 | 45 | 0 | 6 o | H | Posterior. Slight calcification | ? + | N.D. | ??? A.P.H. | Calcification |
| 66 | 78 | C.R. | P | 21 | 38 | 3 | | B(E) | Fundal | - | | Unstable lie ? cause | |
| | | | | | 40 | 2 | 7 15 | H | Fundal | - | N.D. | Ext. version | |
| 67 | 79 | E.A. | P | 28 | 41 | 1 | 8 13 | H | Posterior | - | N.D. | | |
| 68 | 80 | L.A. | M.4 | 36 | 38 | 3 | 7 9 | H | Anterior | + | N.D. | B.B.A. | |
| 69 | 81 | E.S. | P | 19 | 39 | 1 | 8 11 | H | Anterior | - | F | Very high head | |
| 70 | 82 | A.P. | M.5 | 40 | 39 | 1 | 7 9 | T | Fundal | - | C.S. | Previous C.S. & trans. lie | At C.S. |
| 71 | 83 | D.C. | M.2 | 25 | ? | 1 | 6 &5 | Tw | Apparent large anterior | - | N.D. ofTw. | Uniovular | |
| 72 | 84 | V.M. | P | 29 | 47 | 9 | 7 11 | H | Anterior | - | N.D. | | |
| 73 | 85 | A.O. | M.2 | 24 | 40 | 0 | 6 4 | H | Posterior | - | N.D. | High head | |
| 74 | 86 | F.C. | M.3 | 25 | 32 | 1 | 4 12 | B(E) | "Normal" anterior | - | B.D. | ? High head. R.H.with antibodies | |
| 75 | 87 | B.D. | M.13 | 42 | ?32 | 0 | 4 3 | B(E) | Fundal cornual | + | B.D. | Cause A.P.H.not found | |
| 76 | 88 | M.W. | P | 40 | 31 | 10 | | Obl. | Antero-lateral (L) | - | | Transverse lie | |
| | | | | | 39 | 1 | 8 2 | T | Antero-lateral (L) | - | C.S. | Transverse lie | At C.S. |
| 77 | 89 | M.S. | P | 22 | 33 | 6 | 7 11 | H | Posterior | - | L.F. | (found | At M.R. |
| 78 | 90 | E.H. | P | 22 | 33 | 7 | | B(E) | "Normal" posterior | + | | Cause A.P.H.not | |
| | | | | | 36 | 4 | 8 3 | H | Posterior | - | N.D. | Sp. version | |
| 79 | 91 | C.M. | M.3 | 27 | 36 | 4 | ? | H | Posterior (Referred case) | + | N.D. | Cause A.P.H.not found | |
| 80 | 92 | H.L. | P | 26 | 39 | 0 | 7 12 | H | Posterior (Head displaced by full (rectum | - | N.D. | High head | |
| 81 | 93 | V.E. | M.2 | 24 | 39 | 5 | | H | High head on erect lateral, no visible cause | - | | High head.Unstable | |
| | | | | | 40 | 4 | 7 5 | H | Posterior. Normal shadows.Head (central | - | N.D. | For confirmation | |
| 82 | 94 | M.J. | M.2 | 24 | 36 | 0 | 7 5 | B($\frac{1}{2}$E) | Fundal cornual with some anterior element | ?+ | C.S. | Breech presentn. Obstet. history | At C.S. |
| 83 | 95 | M.T. | P | 23 | 34 | 8 | 7 6 | B(F) | Fundal cornual.Contracted pelvis (Android) | ?+ | C.S. | Br. & contracted pelvis | At C.S. |
| 84 | 96 | D.M. | P | 21 | 30 | 12 | 6 12 | H | Posterior | - | N.D. | (found | |
| 85 | 97 | G.M. | M.2 | 20 | 41 | 0 | 8 3 | H | Posterior. Slight calcification | + | N.D. | Cause A.P.H.not | Calcification |
| 86 | 98 | J.M. | P | 18 | 38 | 2 | | H | Anterior. Head central | - | | Free head | |
| | | | | | 39 | 1 | 7 0 | H | Anterior. Head central & engaged | - | N.D. | High head | |
| 87 | 99 | E.S. | M.3 | 39 | ?32 | 1 | 4 7 | B(E) | Fundal | + | N.D. | Repeated A.P.H. Sp. version | |
| 88 | 100 | J.M. | M.3 | 30 | 39 | 1 | 6 8 | H | Posterior | + | N.D. | Cause A.P.H.not found | |
| 89 | 101 | E.J. | P | 22 | 39 | 4 | | T | Posterior | - | | Oblique & trans. lies throughout pregnancy | Vaginally |
| | | | | | 41 | 3 | | H | Posterior | - | | | |
| | | | | | 41 | 2 | 7 0 | H | Posterior | - | N.D. | | |
| 90 | 102 | N.S. | M.2 | 36 | 30 | 12 | | T | Fundal | - | | Trans.lie ? cause | |
| | | | | | 38 | 4 | 8 11 | T | Fundal | - | N.D. | Trans.lie ? cause | |
| 91 | 103 | J.B. | M.5 | 29 | 40 | 6 | | H | Posterior (No erect lateral) | - | | Unstable lie | |
| | | | | | 40 | 6 | 8 6 | H | Posterior | - | N.D. | | |
| 92 | 104 | E.M. | M.2 | 27 | 34 | 4 | 6 &6 | Tw | Apparently one large ant. shadow | - | N.D. of Tw. | | |
| 93 | 105 | M.F. | M.4 | 21 | 37 | 3 | 6 12 | H | Anterior | - | N.D. | | |
| 94 | 106 | E.R. | M.8 | 38 | 36 | 4 | 6 0 | H | Posterior | + | N.D. | High head. Cause A.P.H.not found | |
| 95 | 107 | J.S. | P | 18 | 36 | 4 | 6 12 | H | Anterior | - | N.D. | High head | |
| 96 | 108 | L.R. | M.2 | 37 | 28 | 12 | 7 12 | B(E) | Anterior & to (R). Early in pregnancy & films poor | + | L.F. | Cause A.P.H.not found. Sp.vers. | At M.R. |
| 97 | 109 | A.R. | M.3 | 28 | ? | 0 | 5 13 | H | Anterior. Central & full engagemnt | + | N.D. | A.P.H.Cause not found.High head | |
| 98 | 110 | B.H. | M.3 | 32 | 37 | 5 | | H | Posterior | - | | | Amniography |
| | | | | | 38 | 5 | 8 8 | H | Posterior (Amniography-confirmed) | - | N.D. | | |
| 99 | 111 | E.J. | M.12 | 40 | 28 | 12 | 7 11 | H | Anterior. Marked hydramnios | ?+ | N.D. | ?? A.P.H. | Vaginally |
| 100 | 112 | E.N. | M.3 | 34 | 36 | 4 | 9 0 | H | Posterior | - | N.D. | | |
| 101 | 113 | L.S. | M.2 | 24 | 37 | 1 | 5 7 | H | Posterior. Foetus shows "sitting Bhudda" attitude | - | N.D. | Rh-with antibodies | |
| 102 | 114 | M.C. | M.3 | 38 | 37 | 6 | 7 8 | H | Posterior | - | N.D. | High head | |
| 103 | 115 | E.W. | M.2 | 32 | 38 | | | H | Posterior | | | Not known | |

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 104 | 116 | A.H. | P | 22 | 38 | 4 | | H | Posterior. Appears central engagement | - | | Head in R.I.F. | |
| | | | | | 42 | 0 | 6 11 | H | Posterior | - | N.D. | To confirm | |
| 105 | 118 | E.W. | M.3 | 30 | 37 | 3 | 7 12 | H | Posterior | - | N.D. | High prominent head | |
| 106 | 120 | B.E. | M.2 | 38 | 36 | | | B(E) | Anterior & Fundal | | | D.N.A. again | |
| 107 | 121 | J.C. | M.2 | 32 | 35 | 4 | 8 11 | H | Posterior | - | N.D. | High head | |
| 108 | 122 | D.R. | M.2 | 24 | 37 | 2 | 8 2 | H | Posterior | - | N.D. | Unstable lie | |
| 109 | 123 | C.M. | M.2 | 26 | ? | 0 | 8 15 | H | Anterior. Central head. In labour | - | N.D. | High head.??A.P.H. | |
| 110 | 124 | M.H. | M.2 | 27 | 37 | 3 | 6 5 | H | Posterior. Central partly engaged head | - | N.D. | Transverse lie | |
| 111 | 125 | R.J. | M.3 | 32 | 31 | 9 | 6 12 | B(E) | Anterior & Fundal. Breech central | - | N.D. | Trans.lie (Sp.V.) | |
| 112 | 126 | D.U. | M.3 | 22 | 39 | 0 | 5 13 | B(E) | Fundal cornual | - | B.D. | | |
| 113 | 127 | A.H. | M.2 | 27 | 40 | 1 | 7 0 | H | Anterior | - | N.D. | High head | |
| 114 | 128 | E.W. | M.2 | 22 | 36 | | | H | Posterior | | | Not known | |
| 115 | 129 | M.S. | M.2 | 22 | 37 | 5 | 8 15 | H | Anterior | - | N.D. | | |
| 116 | 130 | E.L. | P | 27 | 36 | 4 | | B(F) | Fundal cornual) Contracted pelvis | | | (tracted pelvis | |
| | | | | | 37 | 3 | 7 15 | B(F) | " " ) | - | C.S. | Breech in con- | At C.S. |
| 117 | 131 | J.W. | M.3 | 33 | 37 | 4 | | Obl. | Posterior (No erect lateral) | | | Transverse lie | |
| | | | | | 41 | 0 | 7 15 | H | Posterior. Central head | - | N.D. | For confirmation | |
| 118 | 132 | M.K. | P | 26 | 36 | 4 | | H | Anterior. High head. Lower limit not recognised | - | | High head | |
| | | | | | 37 | 3 | 9 1 | H | Anterior. Head very close to symphysis pubis | - | F. | Confirmation. (found | At M.R. |
| 119 | 133 | A.D. | P | 21 | 37 | 4 | 6 8 | H | Anterior | + | N.D. | Cause A.P.H.not | |
| 120 | 134 | M.B. | P | 19 | 33 | 7 | | B(F) | Fundal | - | | High presenting pt. | |
| | | | | | 35 | 5 | 7 8 | B(F) | Fundal | - | C.S. | Oblique lie in lbr. | At C.S. |
| 121 | 135 | E.K. | M.2 | 24 | 40 | 4 | | H | Anterior. Head high but central | - | | Very high head | |
| | | | | | 41 | 3 | 8 0 | H | Anterior. Head central & partly engaged | - | N.D. | For confirmation | |
| 122 | 136 | F.H. | M.3 | 24 | ?29 | 1 | 2 15 | B(F) | Fundal and cornual | + | B.D. | Repeated A.P.H. Cause not found | |
| 123 | 137 | C.G. | M.4 | 34 | 29 | 10 | | B(E) | Site not definitely identified | + | | Cause A.P.H.not | |
| | | | | | 36 | 3 | 7 10 | B(E) | Fundal and cornual | - | B.D. | (found | At M.R. |
| 124 | 139 | M.M. | M.6 | 41 | 40 | 2 | | H | Posterior. High head. | - | | Unstable lie | |
| | | | | | 42 | 0 | 6 15 | H | Posterior. Head central & almost fully engaged | - | N.D. | For confirmation | |
| 125 | 141 | J.J. | P | 23 | 35 | 2 | 5 11 | H | Posterior | - | N.D. | (found | |
| 126 | 142 | E.V. | M.6 | 32 | 33 | 10 | | H | Posterior | + | | Cause A.P.H.not | |
| | | | | | 39 | 4 | 8 7 | H | Posterior | + | N.D. | For confirmation | Vaginally |
| 127 | 143 | I.C. | M.2 | 26 | 36 | 4 | 7 14 | B(F) | Fundal, larger element posterior. Breech central | - | B.D. | Oblique lie | |
| 128 | 146 | G.W. | P | 24 | 31 | 9 | | H | Erect lateral only. High central head, no cause seen | - | | High head | |
| | | | | | 33 | 7 | | H | Anterior. High head. No cause | - | | High head | |
| | | | | | 40 | 0 | 9 12 | H | Erect lateral only in labour. Head trans. & fully engaged | - | L.F. | In labour ?dis-proportion | |
| 129 | 147 | E.C. | M.2 | 28 | 27 | 9 | | T | Straight films only | - | | Transverse lie | |
| | | | | | 28 | 8 | | B(F) | Fundal cornual | - | | Unstable breech | |
| | | | | | 30 | 6 | 8 6 | B(E) | Fundal cornual | - | B.D. | | |
| 130 | 148 | M.I. | M.2 | 20 | 32 | 6 | | H | Posterior | - | | Unstable lie | |
| | | | | | 34 | 3 | 8 4 | H | Posterior (Amniography confirming | - | N.D. | | Amniography |
| 131 | 150 | L.F. | M.2 | 22 | 37 | 3 | 8 8 | B(E) | Fundal cornual | - | N.D. | Ext. version | |
| 132 | 151 | O.D. | M.2 | 25 | 36 | | | H | Posterior | | | Not known | |
| 133 | 152 | C.M. | M.2 | 26 | 37 | 2 | 7 0 | H | Posterior | - | N.D. | Oblique lie | |
| 134 | 153 | V.P. | M3 | 26 | 33 | 4 | 5 1 | B(F) | Fundal larger element posterior | - | N.D. | (Sp. version) | |
| 135 | 154 | P.K. | M.3 | 27 | 37 | 4 | 7 6 | H | Posterior | + | N.D. | Cause A.P.H.not found | |
| 136 | 155 | I.P. | M.4 | 28 | 33 | 1 | 8 1 | H | Posterior | + | N.D. | Cause A.P.H.not found | |
| 137 | 157 | L.P. | M.5 | 28 | 32 | 8 | 5 4 | H | Anterior | + | N.D. | Cause A.P.H.not found | |
| 138 | 158 | C.R. | P | 34 | 26 | 14 | | T | Anterior. Low limit placenta not defined | - | | | |
| | | | | | 34 | 6 | 7 9 | H | Anterior | - | N.D. | For confirmation | |
| 139 | 159 | F.R. | M.3 | 36 | 37 | 4 | 7 12 | H | Posterior | + | N.D. | No cause for APH found. Delivered elsewhere | |
| 140 | 160 | L.K. | M.3 | 23 | 39 | 3 | 7 0 | B(E) | Fundal larger element posterior | ?+ | N.D. | ??APH(Sp.version) | |
| 141 | 161 | A.F. | P | 21 | 32 | 8 | 8 8 | B(E) | Fundal larger element posterior | + | B.D. | Cause A.P.H.not found | Vaginally |
| 142 | 163 | M.C. | M.3 | 26 | 35 | 4 | 7 1 | H | Lateral (left wall) | - | N.D. | | |
| 143 | 164 | E.H. | M.2 | 28 | 40 | 2 | 7 10 | H | Posterior | - | N.D. | Head free & diff- | |
| 144 | 165 | C.G. | P | 17 | 32 | 5 | | H | Erect lateral only. Head central & fully engaged | - | | (icult to feel. (found | |
| | | | | | 33 | 3 | 7 11 | H | Anterior (-ed | + | F | Cause A.P.H.not | Vaginally |
| 145 | 166 | J.K. | M.6 | 31 | 40 | 6 | 8 13 | H | Anterior. Head central&partly enged | - | N.D. | Transverse lie | |
| 146 | 167 | D.R. | M.8 | 37 | 36 | 3 | | T | Anterior lower limit not defined, possible low (engaged | - | | Trans.lie. Unstable | |
| | | | | | 37 | 2 | | B(E) | Anterior. Breech central & partly | - | | Unstable | |
| | | | | | 39 | 1 | 6 14 | H | Anterior. Vertex central & partly engaged | - | N.D. | (Sp. version) | Vaginally |
| 147 | 168 | C.L. | M.2 | 38 | 37 | 2 | 6 1 | B(E) | Posterior | - | N.D. | (Sp. version) | |
| 148 | 169 | R.A. | P | 23 | 36 | 4 | 6 10 | H | Anterior | - | N.D. | High head | |
| 149 | 170 | E.C. | P | 29 | 34 | 7 | 10 0 | H | Posterior. Pelvimetry-normal pelvis | - | F | High head | |

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 150 | 171 | L.C. | P | 20 | 36 | 4 | 7 2 | H | Anterior | - | N.D. | | |
| 151 | 172 | J.R. | M.2 | 21 | 39 | 1 | 6 8 | H | Posterior | - | N.D. | (found | |
| 152 | 173 | D.D. | M.3 | 29 | 34 | 4 | 7 3 | H | Anterior | + | N.D. | Cause A.P.H.not | |
| 153 | 174 | J.H. | P | 36 | 31 | 6 | | B(E) | Fundal larger posterior element | - | | | |
| | | | | | 35 | 2 | 6 5 | B(E) | Fundal larger posterior element | - | B.D. | | Vaginally |
| 154 | 175 | S.D. | M.2 | 33 | 35 | 6 | 7 0 | B(F) | Normal anterior | - | N.D. | (Sp. version) | |
| 155 | 176 | F.W. | M.2 | 27 | 42 | 1 | 7 11 | H | Posterior | + | F | Cause A.P.H. not | At M.R. |
| 156 | 177 | A.S. | M.6 | 45 | 35 | 9 | | B(½E) | St. films only | - | | (found | |
| | | | | | 39 | 4 | | H | Anterior | - | | Unstable lie (Sp.version) | |
| | | | | | 41 | 3 | 9 3 | H | Anterior. Central & full engagement | - | N.D. | | |
| 157 | 178 | J.S. | M.6 | 48 | 37 | 1 | 6 8 | H | Posterior | ?+ | N.D. | ?? A.P.H. | |
| 158 | 179 | E.P. | P | 27 | 36 | 5 | 8 3 | B(E) | Normal anterior | - | L.F. | Unstable lie (Ext.version) | |
| 159 | 180 | B.K. | M.2 | 28 | 32 | 9 | 8 10 | H | Posterior | ?+ | N.D. | ?? A.P.H. | |
| 160 | 181 | H.B. | M.4 | 25 | 32 | 8 | 8 7 | H | Posterior | | | Very mobile foetus | |
| 161 | 182 | D.H. | M.4 | 26 | 34 | 6 | | T | Straight films only | - | | Oblique lie | |
| | | | | | 37 | 3 | 7 13 | H | Anterior | - | N.D. | | |
| 162 | 183 | E.H. | M.2 | 27 | 36 | 7 | 7 13 | H | Anterior. Head central & partly engaged | - | N.D. | Transverse lie | |
| 163 | 184 | M.C. | M.3 | 21 | 41 | 4 | 7 0 | H | Posterior. Pendulous abdomen. Head central | - | N.D. | Trans. & oblique lie | |
| 164 | 185 | M.Q. | P | 24 | 38 | 2 | 7 2 | H | Anterior. Head central & fully engaged | - | N.D. | High head | |
| 165 | 186 | I.L. | M.3 | 25 | 35 | 5 | 7 4 | T | Posterior | - | N.D. | Sp. version | |
| 166 | 187 | R.M. | M.2 | 25 | 38 | 3 | | B(F) | Fundal.Larger element anterior | - | | High presenting pt. | |
| | | | | | 39 | 2 | 6 4 | H | Fundal.Larger element anterior | - | N.D. | (Sp. version) | |
| 167 | 188 | G.L. | M.4 | 30 | 35 | 4 | 6 &6 | Tw | Difficult to interpret,possibly anterior | - | N.D. ofTw. | | |
| 168 | 189 | I.B. | M.2 | 27 | 37 | 3 | 6 15 | H | Fundal | - | F | (found | |
| 169 | 190 | M.H. | P | 24 | 39 | 1 | 8 0 | H | Anterior | + | F | Cause A.P.H.not | Vaginally |
| 170 | 191 | M.M. | P | 22 | 33 | 7 | 3 11 | H | Posterior | + | F | Cause A.P.H.not (found | |
| 171 | 192 | M.M. | P | 23 | 39 | 1 | 6 3 | H | Anterior (Amniography) (Unexplained S.B.) | + | N.D. S.B. | Cause A.P.H.not (found | (Amniography (Vaginally |
| 172 | 193 | M.C. | P | 27 | 38 | 2 | 6 0 | H | Posterior (Subsequently foetus showed toxoplasmic intracranial calcification) | - | F | | |
| 173 | 194 | F.O. | M.2 | 27 | 37 | 3 | 7 10 | H | Anterior | + | N.D. | (found Cause A.P.H.not | |
| 174 | 195 | E.T. | M.1 | 37 | 37 | 3 | 8 7 | H | Posterior. Head central | - | N.D. | Oblique lie | |
| 175 | 196 | E.R. | M.4 | 34 | 36 | 5 | 3 3 | H | Posterior (Anencephalic foetus) Confirmatory amniography | - | N.D. | | Amniography |
| 176 | 197 | M.O. | M.9 | 34 | 28 | 11 | | H | Anterior lower limit not defined | - | | | |
| | | | | | 32 | 7 | 8 11 | H | Anterior. Central & full engagement of head | - | N.D. | | |
| 177 | 198 | A.H. | M.3 | 35 | 37 | 4 | 7 0 | B(F) | Fundal larger element posterior | - | B.D. | | |
| 178 | 200 | L.D. | P | 21 | 31 | 10 | | H | Erect lateral only. Very high head, probably due to full rectum | - | | | |
| | | | | | 41 | 0 | 7 14 | H | Anterior | - | N.D. | | |
| 179 | 201 | F.H. | M.4 | 27 | 36 | 4 | | T | Posterior | - | | Transverse lie | |
| | | | | | 37 | 3 | 8 12 | H | Posterior | - | N.D. | Sp. version | |
| 180 | 203 | D.S. | M.3 | 26 | 36 | | | H | Anterior | - | | | |
| 181 | 205 | I.W. | M.3 | 37 | 39 | 1 | 6 10 | H | Anterior. Head central | - | N.D. | Transverse lie | |
| 182 | 206 | C.H. | M.3 | 31 | 37 | 0 | 7 14 | H | Posterior | + | N.D. | Cause A.P.H.not (found | |
| 183 | 207 | M.M. | M.12 | 37 | 38 | 3 | | B(E) | St. films only | - | | | |
| | | | | | 39 | 1 | 10 1 | H | Anterior | - | N.D. | Sp. version | |
| 184 | 208 | M.W. | P | 28 | 34 | - | - | H | Anterior | Patient died before delivery | | | At P.M. |
| 185 | 209 | M.F. | M.4 | 24 | 36 | 7 | | H | Anterior.Head displaced forwards | + | | Cause A.P.H.not found | |
| | | | | | 37 | 6 | 6 5 | H | Anterior. Head central | - | N.D. | For confirmation | |
| 186 | 211 | W.M. | M.2 | 23 | 35 | 4 | | B(F) | Anterior - "Normal" | | | Unstable lie.? trans. | |
| | | | | | 37 | 2 | 8 10 | H | Anterior | - | N.D. | (Sp.version) | |
| 187 | 212 | E.B. | M.7 | 35 | 39 | 2 | 7 9 | H | Posterior | + | N.D. | Cause A.P.H.not | |
| 188 | 213 | M.F. | M.3 | 29 | 42 | 0 | 7 10 | H | Anterior | - | N.D. | (found | |
| 189 | 214 | R.H. | M.2 | 27 | 37 | 4 | 6 12 | H | Posterior | - | N.D. | High head | |
| 190 | 215 | L.T. | M.2 | 29 | 35 | 4 | 6 12 | H | Posterior | - | N.D. | | |
| 191 | 216 | M.C. | P | 27 | 35 | 6 | 8 0 | H | Posterior | - | N.D. | Unstable lie | |
| 192 | 217 | J.S. | P | 19 | 40 | 2 | | H | Erect lat. only. Head central | - | | High head | |
| | | | | | 41 | 1 | 10 0 | H | Anterior - moderately calcified | - | F | Confirmation | |
| 193 | 218 | L.H. | M.6 | 35 | 37 | 4 | 6 13 | H | Anterior | - | N.D. | | |
| 194 | 219 | H.S. | M.2 | 31 | 33 | 2 | 5 4 | H | Posterior | - | N.D. | (found | |
| 195 | 220 | J.H. | P | 25 | 36 | 3 | | H | Posterior - no erect lateral | + | | Cause A.P.H.not | |
| | | | | | 39 | 0 | 5 15 | H | Erect lat.in labour. Occipito-post. & fully engaged | - | F | | |
| 196 | 221 | D.D. | M.5 | 35 | 37 | 2 | 7 5 | T | Fundal | - | N.D. | Delivered elsewhere | |
| 197 | 222 | C.S. | M.3 | 33 | 36 | 1 | 7 12 | H | Anterior | - | N.D. | | |
| 198 | 224 | A.M. | M.2 | 26 | 37 | 1 | 7 1 | H | Anterior (Dyschondroplasic foetus) | - | N.D. | | |
| 199 | 225 | E.R. | M.2 | 31 | 40 | 0 | 5 3 | H | Posterior | - | N.D. | | |
| 200 | 226 | B.D. | P | 22 | 36 | 3 | 6 10 | B(E) | Normal anterior | - | N.D. | (Sp. version) | |
| 201 | 227 | F.O. | M.2 | 21 | 40 | 1 | 8 6 | H | Anterior | - | N.D. | | |
| 202 | 229 | A.N. | P | 23 | 36 | 3 | 6 10 | B(E) | Fundal | - | N.D. | Ext. version | |
| 203 | 230 | O.M. | M.9 | 34 | 39 | 1 | 8 11 | H | Anterior | - | N.D. | | |
| 204 | 231 | W.M. | M.2 | 27 | 37 | 2 | 8 10 | H | Anterior | - | N.D. | Very unstable | |
| 205 | 232 | V.O. | M.3 | 26 | 36 | 5 | 7 6 | H | Posterior | - | N.D. | | |
| 206 | 233 | M.F. | M.4 | 24 | 37 | 1 | 6 5 | H | Anterior | - | N.D. | | Vaginally |
| 207 | 235 | E.R. | P | 21 | 42 | 1 | 9 3 | H | Anterior. Central head | - | N.D. | High head | Vaginally |

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 208 | 238 | M.C. | P | 23 | 37 | 5 | 7 8 | B(E) | Normal posterior | - | N.D. | Sp. version | |
| 209 | 239 | M.P. | P | 23 | 33 | 4 | 6 13 | H | Posterior | - | N.D. | High head | |
| 210 | 241 | A.M. | M.2 | 26 | 37 | 4 | 7 1 | H | Anterior | - | N.D. | | |
| 211 | 243 | I.C. | P | 22 | 34 | 3 | 7 1 | H | Posterior | - | N.D. | Unstable lie | |
| 212 | 244 | J.H. | M.4 | 34 | 37 | 3 | 8 2 | H | Anterior | - | N.D. | | |
| 213 | 246 | M.T. | M.3 | 28 | 38 | 0 | 5 3 | B(E) | Fundal | - | B.D. | Trans.lie<br>Later breech | Vaginally |
| 214 | 247 | L.C. | M.6 | 37 | 29 | 10 | 6 &6 | Tw | Apparent large posterior placenta | | N.D. of Tw | | |
| 215 | 249 | P.B. | P | 19 | 38 | 4 | 7 15 | H | Posterior | - | N.D. | | |
| 216 | 250 | H.C. | P | 22 | 37 | 3 | 5 &6 | Tw | Difficult to interpret. Doubtful anterior position | - | N.D. of Tw | | |
| 217 | 251 | R.G. | P | 28 | ? | 0 | 3 15 | B(E) | Fundal cornual | + | B.D. | (found<br>Cause A.P.H.not | |
| 218 | 253 | J.P. | M.2 | 29 | 34 | 7 | 6 12 | B(E) | Fundal | - | N.D. | Sp. version | |
| 219 | 254 | E.D. | M.3 | 35 | 38 | 2 | | B(E) | Ant. & lat.(R). spreading on to fundus,i.e. over (R) cornu | | | Sp. version | |
| | | | | | 40 | 0 | 6 15 | H | Amniography. Ant. & R.lat. wall & covers (R) cornu | - | N.D. | (Perforation of foetus) | Amniography |
| 220 | 255 | M.O. | M.2 | 25 | 36 | 4 | 9 1 | H | Posterior. Marked platypelloid pelvis | - | C.S. | For disproport'n | At C.S. |
| 221 | 256 | E.M. | P | 27 | 39 | 1 | 8 5 | H | Anterior | - | F | | Vaginally |
| 222 | 257 | M.M. | P | 17 | 36 | 5 | | B(E) | Fundal cornual | - | | | |
| | | | | | 38 | 3 | 6 2 | B(E) | Fundal cornual | - | B.D. | | |
| 223 | 258 | E.H. | P | 23 | 35 | 2 | | B(E) | Fundal cornual | - | | | |
| | | | | | 37 | 0 | 5 13 | B(E) | Fundal cornual | - | B.D. | | At M.R. |
| 224 | 259 | E.B. | M.3 | 26 | 38 | 2 | | B(E) | Anterior (normal) | - | | | |
| | | | | | 39 | 1 | 5 14 | H | Anterior | - | N.D. | Sp. version | |
| 225 | 260 | M.J. | M.3 | 21 | 35 | 9 | 6 9 | B(E) | Fundal cornual | - | N.D. | Ext. version | |
| 226 | 261 | A.O. | M.3 | 28 | 35 | 5 | 7 6½ | B(E) | Ant. & fundal (possibly Fundal cornual) | - | N.D. | Sp. version | |
| 227 | 262 | V.B. | P | 22 | 35 | 8 | | H | Erect lateral only. Central head | - | | Oblique lie | |
| | | | | | 38 | 5 | | T | Anterior | - | | Transverse lie | |
| | | | | | 40 | 3 | 6 7 | H | St. film only | - | M.R. + F. | Stable as vertex. | |
| 228 | 262 | J.M. | M.4 | 25 | 36 | 4 | | B(E) | Posterior | + | | (found<br>Cause A.P.H.not | |
| | | | | | 38 | 2 | 7 10 | H | Posterior (version before x-ray) | ?+ | N.D. | Ext. version | |
| 229 | 264 | E.B. | M.3 | 25 | 36 | 5 | 8 6 | B(E) | Fundal cornual | - | N.D. | Ext. version | |
| 230 | 265 | T.F. | M.3 | 25 | 34 | 8 | 7 5 | T | Anterior | - | N.D. | ?Cause trans.lie | |
| 231 | 266 | E.R. | M.16 | 37 | 38 | 3 | 9 8 | B(E) | Normal posterior | - | N.D. | Sp. version | |
| 232 | 267 | M.S. | P | 29 | 29 | 9 | 6 12 | B(E) | Fundal cornual | - | N.D. | Sp. version | |
| 233 | 268 | M.F. | M.4 | 29 | 34 | 7 | 6 6 | B(F) | Fundal cornual | - | B.D. | Over R.cornu | At M.R. |
| 234 | 270 | E.B. | M.4 | 29 | 36 | 6 | 7 4 | B(E) | Fundal cornual.Amniography confirm'g | - | N.D. | Trans.& obl.lies | |
| 235 | 271 | M.H. | P | 27 | 34 | 8 | 7 7 | B(½E) | Anterior and fundal | - | F. | Sp. version | |
| 236 | 272 | R.N. | P | 26 | 35 | 3 | 4 &5 | Tw | Difficult to interpret,possibly one large posterior | | N.D. of Tw | | Uniovular |
| 237 | 273 | E.R. | P | 24 | 40 | 1 | 7 9 | H | Posterior. Head centrally engaged | - | F | High head | |
| 238 | 274 | M.R. | M.7 | 32 | 41 | 0 | | T | Anterior | - | | ? Cause trans.lie | |
| | | | | | 41 | 0 | 8 9 | H | Amniography (Failed,gave rise to I.V.P.) Central head | - | N.D. | (A.failed)<br>(lies | |
| 239 | 275 | A.B. | M.3 | 39 | 39 | 3 | | B(E) | Fundal cornual.(Contracted pelvis) | - | | Trans.& oblique | |
| | | | | | 40 | 2 | 7 6 | T | Fundal appearance only | - | C.S. | For pelvis.Oblique lie | At C.S. |
| 240 | 276 | P.S. | P | 23 | 30 | 11 | | B(½E) | Fundal cornual | + | | Cause A.P.H.not found | |
| | | | | | 34 | 7 | 6 15 | B(F) | Fundal cornual (eat | - | N.D. | Ext. version | |
| 241 | 279 | E.E. | M.5 | 26 | 34 | 7 | | T | Anterior ? lower limit request rep- | - | | ? Cause trans.lie | |
| | | | | | 36 | 5 | 8 10 | H | Anterior. Centrally engaged head | - | N.D. | For confirmation | |
| 242 | 280 | M.R. | M.2 | 33 | 37 | 5 | | T | Anterior. No erect lateral | - | | ? Cause trans.lie | |
| | | | | | 38 | 4 | 7 4 | H | Anterior. Centrally engaged head. | - | N.D. | For confirmation | |
| 243 | 281 | F.W. | M.2 | 27 | 36 | 6 | 8 2 | H | Anterior. | - | F | High head | |
| 244 | 282 | B.E. | P | 18 | 35 | 6 | 7 11 | H | Posterior | - | N.D. | High head | |
| 245 | 283 | A.D. | P | 23 | 35 | 5 | 6 8 | B(E) | Anterior and fundal | - | B.D. | | |
| 246 | 284 | E.P. | P | 31 | 37 | 6 | 7 8 | B(E) | Posterior and fundal | - | N.D. | Sp. version | |
| 247 | 285 | L.R. | M.6 | 32 | 39 | 1 | 8 3 | H | Posterior | + | N.D. | Cause A.P.H.not found | |
| 248 | 286 | P.R. | M.2 | 23 | 40 | 1 | 9 9 | H | Anterior | + | N.D. | Cause A.P.H.not found | |
| 249 | 287 | C.S. | P | 23 | 31 | 8 | 6 3 | H | Posterior | + | N.D. | Cause A.P.H.not found | |
| 250 | 288 | F.B. | M.3 | 27 | 38 | 2 | 8 0 | H | Posterior | + | N.D. | Cause A.P.H.not found | |
| 251 | 289 | M.C. | M.2 | 28 | 36 | 6 | 8 0 | B(½E) | Posterior and fundal | - | N.D. | Sp. version | |
| 252 | 290 | S.M. | M.4 | 34 | 38 | 3 | | T | Anterior | - | | ? Cause trans.lie | |
| | | | | | 40 | 1 | 8 0 | H | Amniography. Anterior. | | | | Amniography |
| 253 | 291 | L.R. | M.2 | 27 | 39 | 0 | 5 10 | H | Anterior | + | N.D. | Cause A.P.H.not found | |
| 254 | 292 | A.C. | M.2 | 32 | 34 | 6 | 6 4 | B(E) | Posterior and fundal | - | N.D. | Sp. version | |
| 255 | 293 | M.S. | M.6 | 28 | 35 | 4 | 7 11 | B(E) | Posterior and fundal | - | N.D. | Sp. version | |
| 256 | 294 | P.S. | P | 20 | 36 | 5 | 5 14 | H | Posterior (monster) | + | N.D. | Cause A.P.H.not found | |
| 257 | 295 | P.H. | P | 23 | 38 | 0 | 3 3 | H | In labour.Anterior.(Anencephalic | - | | | |
| | | | | | 38 | 0 | 3 3 | H | Injection of cord vessels during labour (Figs. 3,4,5) | - | N.D. | | By injec't'n cord |
| 258 | 296 | I.M. | M.3 | 22 | 35 | 7 | 5 6 | H | Posterior.Very high head.Soft tissue outline pelvic mass separate from uterus recognised. | - | C.S. | Pregnancy & ovarian cyst | At C.S. |
| 259 | 297 | E.S. | M.2 | 27 | 40 | 0 | 8 0 | H | Anterior | ?+ | N.D. | ?? A.P.H. | |

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 260 | 298 | M.K. | M.4 | 28 | 36 | 5 | 7 14 | T | Anterior | - | N.D. | ?Cause trans.lie | |
| 261 | 299 | E.R. | P | 19 | 36 | 2 | 4 9 | B(F) | Fundal | - | L.F. | Sp. version | |
| 262 | 300 | E.C. | M.2 | 23 | 38 | 3 | 7 14 | H | Anterior | - | N.D. | | |
| 263 | 301 | L.G. | P | 19 | 34 | 5 | 4 0 | H | Anterior | ?+ | L.F. | ?? A.P.H. | |
| 264 | 302 | O.T. | P | 24 | 37 | 3 | | H | Anterior | - | | High head | |
| | | | | | 39 | 2 | 7 6 | H | Anterior.Head centrally engaged | - | N.D. | High head | |
| 265 | 304 | M.H. | P | 25 | 38 | 4 | 6 11 | H | Ant.& to left. Head cent. engaged | - | F | Trans lie | |
| 266 | 305 | M.H. | P | 19 | 40 | 0 | 6 3 | H | Posterior | + | N.D. | Cause A.P.H.not found | |
| 267 | 306 | G.G. | P | 36 | 36 | 0 | 7 15 | H | Posterior | + | C.S. | Acc.haem & long (labour | At C.S. |
| 268 | 307 | M.H. | P | 19 | 42 | 0 | 7 6 | B(E) | In labour.Well calcified placenta, on ant.& rt.lat.walls & fundus | - | B.D. | | Calcified |
| 269 | 308 | L.S. | M.6 | 28 | 40 | 1 | 8 11 | H | Anterior | + | N.D. | Cause A.P.H.not found | |
| 270 | 309 | T.L. | M.3 | 21 | 41 | 0 | 7 1 | H | In labour. Posterior | + | N.D. | ?Cause A.P.H. (not found | Vaginally. |
| 271 | 310 | V.F. | M.3 | 29 | 39 | 3 | | T | Anterior (Anencephalic monster) | - | N.D. | | (cord |
| | | | | | 42 | 0 | 3 8 | H | Injection of cord vessels | | | | By inject'n |
| 272 | 311 | E.W. | P | 37 | 40 | 0 | 6 3 | H | Posterior | + | C.S. | Acc.haem., elderly P. | At C.S. |
| 273 | 312 | S.G. | P | 19 | 36 | 6 | 5 13 | B(E) | Fundal cornual | - | B.D. | | |
| 274 | 313 | E.C. | P | 28 | 35 | 5 | 5 10 | B(½E) | Fundal cornual | - | B.D. | | |
| 275 | 314 | E.W. | M.2 | 35 | 40 | 0 | 6 8 | H | Posterior | - | N.D. | High head | |
| 276 | 315 | C.K. | M.11 | 43 | 40 | 0 | 6 13 | H | Posterior | + | N.D. | Acc. haem. | |
| 277 | 316 | M.M. | M.2 | 40 | 39 | 0 | 8 8 | H | Anterior | - | C.S. | Repeat C.S. & I.U.A. | At C.S. |
| 278 | 318 | S.N. | M.2 | 22 | 34 | 5 | | B(F) | Lt.lat.wall & fundus to small extent | - | | Sp. version | |
| | | | | | 40 | 0 | 7 5 | H | In labour.Calcified placenta. Lt.lat. wall just covering cornu & encroaching on fundus | - | N.D. | | Calcified |
| 279 | 319 | F.R. | M.3 | 22 | 39 | 0 | 7 2 | H | In labour.Calcified placenta. Ant. | - | N.D. | | Calcification |
| 280 | 320 | J.D. | M.9 | 31 | 39 | 0 | 8 10 | H | In labour.Slight calcification placenta. Anterior | + | N.D. | A.P.H.Cause not found (lie | Calcification |
| 281 | 321 | M.T. | M.3 | 33 | 36 | 4 | | T | Anterior. No erect lateral | ?+ | | ?A.P.H.& trans. | |
| | | | | | 38 | 2 | 6 8 | H | Anterior. Head centrally engaged | - | F | 2 previous C.S. | At M.R. |
| 282 | 322 | C.B. | P | 21 | 39 | 2 | | B(½E) | Fundal cornual.(Lat.abdo.& erect lateral only) | - | | | |
| | | | | | 41 | 0 | 6 7 | B(½E) | In labour.Calcified placenta. Fundus & rt. lateral wall | - | B.D. | | Calcification |
| 283 | 323 | L.M. | P | 18 | 43 | 0 | 7 0 | H | Marked calcification placenta. Ant. | - | N.D. | | Calcification |
| 284 | 324 | M.C. | M.2 | 22 | 38 | 1 | 6 2 | H | Posterior | - | N.D. | High head | |
| 285 | 325 | T.C. | M.3 | 30 | 37 | 4 | 6 7 | H | Posterior | - | N.D. | Unstable lie | |
| 286 | 326 | M.F. | M.2 | 26 | 38 | 7 | | H | Anterior. (No erect lateral) | + | | Cause A.P.H.not (found | |
| | | | | | 44 | 0 | 8 7 | H | Erect lat.shows head centrally eng'd | - | N.D. | | |
| 287 | 327 | E.O. | P | 23 | 40 | 0 | 7 10 | T | Fundal | - | N.D. | ?Cause trans.lie | |
| 288 | 328 | G.F. | P | 25 | 41 | 0 | 5 8 | H | On left lateral wall | - | N.D. | | |
| 289 | 330 | V.B. | P | 18 | 37 | 0 | 5 10 | H | Posterior - slight calcification | - | N.D. | | Calcification |
| 290 | 331 | V.S. | M | 23 | 36 | | | H | Posterior. Head centrally engaged | - | | Not known | |
| 291 | 332 | C.F. | P | 24 | 40 | 0 | 6 13 | H | Ant.& on lt.side. Slight calcific'n | - | N.D. | | Calcification |
| 292 | 333 | E.M. | M.2 | 26 | 42 | 0 | 7 9 | H | Posterior | - | N.D. | High head | |
| 293 | 334 | P.C. | M.4 | 29 | 41 | 0 | 7 5 | H | Posterior | - | N.D. | | |
| 294 | 335 | M.L. | M.4 | 32 | 40 | 0 | 7 10 | H | In labour. Posterior | - | N.D. | | |
| 295 | 336 | M.K. | P | 20 | 42 | 0 | 7 7 | H | In labour.Well calcified post.placenta | - | N.D. | | Calcification |
| 296 | 337 | M.H. | M.3 | 33 | 41 | 0 | 8 6 | H | Posterior | - | C.S. | Brow in labour | At C.S. |
| 297 | 338 | C.E. | M.2 | 20 | 40 | 0 | 4 14 | H | In labour. Posterior | - | N.D. | | |
| 298 | 339 | K.S. | M.3 | 36 | 41 | 0 | 8 4 | H | In labour. Anterior | + | N.D. | Cause A.P.H.not (found | |
| 299 | 340 | V.G. | P | 22 | 42 | 0 | 6 12 | H | In labour.Ant.Slight calcification | - | N.D. | | Calcification |
| 300 | 341 | M.C. | P | 22 | 38 | 3 | | B(E) | Normal posterior | - | | Sp. version | |
| | | | | | 41 | 0 | 8 2 | H | Posterior. Slight calcification | - | M.R. & F. | | Calcification |
| 301 | 342 | M.D. | M.3 | 33 | 42 | 0 | 7 8 | H | In labour.Ant.Slight calcification | - | N.D. | | Calcification |
| 302 | 343 | R.M. | P | 21 | 40 | 0 | 5 15 | B(E) | In labour.Calcified.Fundal & lt.lat. covering left cornu | - | B.D. | | Calcification |
| 303 | 344 | M.P. | M.2 | 31 | 38 | 0 | 7 10 | H | In labour. Calcified. Anterior | - | N.D. | | |
| 304 | 345 | E.W. | P | 24 | 41 | 0 | 7 1 | H | Posterior | - | N.D. | High head | |
| 305 | 346 | B.C. | M.3 | 26 | 34 | 4 | 6 &5 | Tw | Difficult to interpret,probably large posterior placenta | - | N.D. of Tw. | Uniovular | |
| 306 | 347 | T.G. | M.7 | 33 | 36 | 5 | 8 9 | T | Ant.Foetus very close to symphysis | - | Ext.V &N.D. | Ext.Version in labour | |
| 307 | 348 | A.H. | P | 24 | 41 | 3 | | H | Anterior. (No erect lateral) | - | | High head | |
| | | | | | 42 | 0 | 7 0 | H | Erect lateral.Head centrally engaged | - | N.H. | | |
| 308 | 349 | J.A. | M.3 | 29 | ? | 4 | 6 13 | B(½E) | Normal anterior | - | N.D. | Sp. version | |
| 309 | 350 | M.A. | M.2 | 31 | 37 | 3 | | H | Erect lateral shows forward displacement head. (Loaded rectum) | - | | High head | |
| | | | | | 38 | 2 | 9 15 | H | Anterior | - | N.D. | | |
| 310 | 351 | A.A. | P | 21 | 35 | | | B(E) | Normal anterior | - | | Not known | |
| 311 | 352 | S.W. | P | 20 | 39 | 3 | | B(F) | Normal anterior | - | | Sp. version | |
| | | | | | 41 | 1 | 8 3 | H | Anterior | - | N.D. | | |
| 312 | 354 | E.P. | M.6 | 37 | 34 | 5 | 7 6 | B(E) | Fundal | - | N.D. | Sp. version | |
| 313 | 355 | M.P. | P | 32 | 35 | 6 | 5 13 | H | Anterior (On review appears normal anterior placenta) | - | B.D. | | |
| 314 | 356 | W.P. | P | 22 | 35 | | | B(E) | Fundal cornual | - | | Not yet delivered | |
| 315 | 357 | E.P. | M.5 | 34 | 36 | 3 | 7 10 | T | Fundal | - | N.D. | ?cause trans.lie | |
| 316 | 358 | M.N. | M.2 | 35 | 36 | 2 | 6 9 | B(E) | Fundal cornual | - | N.D. | Sp. version | |
| 317 | 359 | D.M. | P | 19 | 40 | 4 | 8 10 | H | Anterior | - | N.D. | High head | |
| 318 | 360 | T.M. | P | 23 | 36 | | | B(½E) | Fundal cornual | | | Not yet delivered | |

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 319 | 361 | E.M. | M.2 | 26 | 37 | 4 | 7 0 | H | Anterior | - | N.D. | High head | |
| 320 | 362 | M.M. | P | 20 | 40 | 3 | 6 5 | H | Posterior | - | N.D. | High head | |
| 321 | 363 | J.M. | M.4 | 28 | 37 | 2 | 7 5 | H | Anterior | - | N.D. | Oblique lie | |
| 322 | 364 | K.L. | M.2 | 27 | 38 | 4 | 9 2 | H | Posterior | + | N.D. | Cause A.P.H.not found | |
| 323 | 365 | M.K. | P | 27 | 36 | 4 | 7 0 | T | Fundal | - | N.D. | ?Cause trans.lie | |
| 324 | 366 | E.J. | M.3 | 28 | 34 | | | H | Posterior and fundal | - | | Not yet delivered. | |
| | | | | | 37 | | | B(½E) | Posterior and fundal | - | | (found | |
| 325 | 367 | A.H. | M.3 | 28 | 33 | 10 | 6 12 | B(E) | Normal posterior | + | N.D. | Cause A.P.H.not | |
| 326 | 368 | A.B. | M.5 | 23 | 36 | 3 | 6 9 | B(E) | Fundal cornual | - | B.D. | | |
| 327 | 369 | A.B. | P | 37 | 38 | 3 | 6 9 | T | Fundal | - | C.S. | Breech in labour | At C.S. |
| 328 | 370 | A.B. | P | 19 | 41 | 0 | 7 0 | B(E) | Fundal cornual left. Slight calcification | - | B.D. | | Calcification |
| 329 | 371 | C.B. | P | 20 | 35 | 3 | 7 4 | B(E) | Posterior and fundal | - | B.D. | | |
| 330 | 372 | E.B. | M.2 | 27 | 36 | 4 | 7 7 | B(F) | Fundal cornual (Right) | - | B.D. | Failed version | |
| 331 | 373 | J.B. | M.2 | 22 | 38 | 2 | | B(F) | Fundal | - | | Sp. version | |
| | | | | | 40 | 0 | 8 3 | H | Fundal | - | N.D. | | |
| 332 | 374 | M.C. | P | 22 | 34 | | | B(E) | Fundal cornual | | | Not known | |
| 333 | 375 | A.E. | M.3 | 32 | 32 | 10 | | T | Normal anterior | - | | Transverse lie | |
| | | | | | 35 | 7 | 9 10 | B(½E) | Normal anterior | - | N.D. | Sp. version | |
| 334 | 376 | M.F. | M.2 | 31 | 38 | 4 | 8 12 | H | Posterior | - | F. | High head | |
| 335 | 377 | E.F. | M.3 | 34 | 35 | 6 | | T | Anterior | - | | ?Cause trans.lie | |
| | | | | | 39 | 2 | 8 8 | H | Anterior.Head centrally engaged | - | N.D. | | |
| 336 | 378 | M.F. | M.3 | 23 | 37 | 0 | 6 8 | B(E) | Fundal cornual | - | B.D. | | |
| 337 | 379 | L.F. | M.4 | 39 | 34 | 5 | 8 3 | B(E) | Fundal cornual(L.).Pendulous abdomen | - | N.D. | Sp. version | |
| 338 | 380 | A.F. | M.5 | 39 | 42 | 0 | 8 0 | T | Anterior and fundal | - | N.D. | ?Cause trans.lie | |
| 339 | 381 | J.F. | M.3 | 31 | 36 | | | H | Anterior | | | Not known | |
| 340 | 382 | G.G. | M.2 | 23 | 35 | 3 | 6 12 | B(½E) | Posterior and fundal | - | B.D. | | |
| 341 | 383 | J.G. | P | 23 | 34 | | | B(F) | Normal anterior | | | Not yet delivered | |
| 342 | 384 | M.H. | M.3 | 29 | 35 | | | B(E) | Fundal cornual (left) | | | Not yet delivered | |
| 343 | 385 | S.H. | M.3 | 33 | 40 | 0 | 7 0 | T | Posterior | - | Ext.V. &N.D. | Ext. version | |
| 344 | 386 | M.H. | M.3 | 29 | 36 | 3 | 7 10 | T | Anterior | - | N.D. | ?Cause trans.lie | |
| 345 | 387 | E.H. | M.2 | 30 | 36 | 4 | | T | Posterior | - | | ?Cause trans.lie | |
| | | | | | 39 | 1 | 6 10 | H | Posterior | - | N.D. | | |
| 346 | 388 | M.G. | P | 31 | 32 | 8 | 5 13 | H | Posterior | - | N.D. | High head | |
| 347 | 389 | A.B. | M.4 | 39 | 38 | 3 | | H | Posterior | - | | | |
| | | | | | 40 | 1 | 8 6 | H | Amniography confirming | - | N.D. | | Amniography |
| 348 | 390 | B.D. | M.5 | 35 | 39 | 3 | | H | Anterior | - | | | |
| | | | | | 41 | 1 | 7 0 | H | Amniography confirming | - | N.D. | | Amniography |
| 349 | 391 | I.D. | P | 22 | 42 | 0 | 6 13 | H | In labour.Calcified placenta ant. | - | N.D. | | Calcification |
| 350 | 392 | M.C. | M.6 | 35 | 40 | 0 | 5 8 | H | In labour.Calcified placenta ant. | - | N.D. | | Calcification |
| 351 | 393 | L.A. | M.4 | 34 | 35 | 4 | | T | Anterior | - | | ?Cause trans.lie | |
| | | | | | 39 | 0 | 7 13 | H | Anterior | - | N.D. | | |
| 352 | 394 | M.F. | M.8 | 37 | 42 | 0 | 8 13 | H | Anterior.Slight calcification | - | N.D. | | Calcification |
| 353 | 395 | F.C. | P | 22 | 38 | 3 | 6 12 | H | Anterior | - | N.D. | High head | |
| 354 | 397 | S.W. | M.4 | 38 | 37 | 4 | 8 0 | T | Anterior | - | Ext.V. &N.D. | Ext.version in labour | |
| 355 | 398 | E.C. | P | 24 | 37 | 4 | 7 5 | H | Anterior | - | N.D. | High head | |
| 356 | 401 | J.F. | M.4 | 42 | 38 | 2 | 8 1 | H | Posterior | - | C.S. | Repeat C.S. | At C.S. |
| 357 | 402 | G.S. | M.2 | 25 | 38 | 3 | 6 1 | H | Posterior | - | N.D. | (found | At M.R. |
| 358 | 403 | F.M. | P | 30 | 39 | 0 | 6 2 | H | Posterior | + | N.D. | Cause A.P.H.not | |
| 359 | 404 | F.L. | M.2 | 23 | 42 | 0 | 7 11 | H | Posterior | - | C.S. | Repeat C.S. | At C.S. |
| 360 | 405 | L.H. | P | 40 | 37 | 6 | | H | Posterior (No erect lateral) | - | | High head | |
| | | | | | 39 | 4 | 6 12 | H | Posterior | - | C.S. | Elderly primip. | At C.S. |
| 361 | 406 | E.H. | M.2 | 30 | 40 | 0 | 8 12 | H | Posterior | + | N.D. | Cause A.P.H.not found | |
| 362 | 407 | M.D. | M.6 | 31 | 38 | 3 | | T | Fundal | - | | ?Cause trans.lie | |
| | | | | | 39 | 2 | 7 10 | H | Erect lat.only shows centrally engaged head | - | N.D. | | |
| 363 | 408 | E.C. | M.2 | 33 | 38 | 4 | 8 6 | B(F) | Fundal cornual | - | B.D. | | |
| 364 | 409 | S.B. | M.5 | 37 | 37 | 1 | 6 9 | B(E) | Fundal cornual | - | B.D. | | |
| 365 | 410 | A.S. | P | 35 | 39 | 5 | 7 2 | B(F) | Anterior and fundal | - | N.D. | Sp. version | |
| 366 | 411 | M.E. | P | 21 | 36 | 6 | 7 1 | B(F) | Fundal cornual | - | B.D. | | |
| 367 | 412 | A.G. | M.2 | 21 | 39 | 2 | 6 6 | H | Posterior | - | N.D. | ?Cause high head | |
| 368 | 413 | L.H. | M.2 | 29 | 36 | 6 | 7 3 | H | Anterior | - | N.D. | ?Cause high head | |
| 369 | 414 | M.F. | M.4 | 33 | 37 | 4 | 6 6 | B(F) | Fundal cornual | - | B.D. | | |
| 370 | 415 | E.G. | M.2 | 27 | 38 | 5 | 7 12 | B(E) | Fundal cornual | - | N.D. | Sp. version | |
| 371 | 416 | I.J. | M.3 | 23 | 37 | 7 | 6 12 | B(E) | Fundal cornual | - | B.D. | | |
| 372 | 417 | C.M. | M.7 | 37 | 37 | 5 | | T | Fundal | - | | | |
| | | | | | 39 | 3 | 7 4 | H | Fundal | - | N.D. | | |
| 373 | 418 | J.M. | P | 22 | 36 | 5 | 5 14 | B(E) | Anterior and fundal (possibly cornual also (R)) | - | B.D. | | |
| 374 | 419 | E.F. | M.3 | 29 | 36 | 7 | 7 14 | B(½E) | Fundal cornual | - | B.D. | | |
| 375 | 420 | M.F. | M.4 | 27 | 35 | 3 | 5 15 | T | Anterior | - | B.D. | | |
| 376 | 421 | G.F. | P | 26 | 36 | 5 | 6 15 | B(E) | Fundal cornual | - | B.D. | | |

Location of the Placenta in the Upper Uterine Segment.

Table 3 details the results obtained in the present series of radiological location of the placenta in 376 cases. The clinical findings are also tabulated.

In 14 cases the clinical findings are incomplete or not yet available. None of the remaining 362 cases were found clinically to have placenta praevia.

Confirmation of the placental site has been made either at Caesarean section, or by vaginal palpation, or at the time of manual removal of the placenta, or (one case only) at post mortem. Where calcification in the placenta was visualized radiologically, this has been regarded as confirmation of the placental site. A total of 82 cases have been confirmed by these methods and no error has been found; ten further cases were confirmed by amniography. The remaining cases have not been directly confirmed, but their subsequent clinical history did not suggest any error in location of the placental site.

The following abbreviations have been used in Table 3:-

| | | |
|---|---|---|
| Acc. Haem. | - | Accidental haemorrhage. |
| Ant. | - | Anterior. |
| A.P.H. | - | Ante-partum haemorrhage. |
| B.B.A. | - | Born before arrival. |
| B.D. | - | Breech delivery. |
| B(E) | - | Breech with oxtended legs presenting. |
| B($\frac{1}{2}$E) | - | Breech with one leg extended and one leg flexed presenting. |
| B(F) | - | Breech with flexed legs presenting. |
| Br. | - | Breech presentation. |
| Cent. | - | centrally. |
| C.S. | - | Caesarean section. |

| | | |
|---|---|---|
| D.N.A. | - | Did not attend. |
| Ext. vers. | - | External version. |
| F. | - | Forceps delivery. |
| F.A. | - | Foetal abnormality. |
| H. | - | Head presenting. |
| I.U.A. | - | Inco-ordinate Uterine Action. |
| L. | - | Left. |
| lat. | - | lateral. |
| lbr. | - | labour. |
| L.F. | - | Low forceps. |
| M. | - | Multigravida. |
| M.R. | - | Manual removal. |
| N.D. | - | Normal vaginal delivery. |
| Obl. | - | Oblique lie. |
| P. | - | Primigravida. |
| post. | - | posterior. |
| presn. | - | presentation. |
| pt. | - | part. |
| R. | - | Right. |
| Sp. vers. | - | Spontaneous version. |
| St. | - | straight. |
| T. | - | Transverse lie. |
| trans. | - | transverse. |
| Tw. | - | Twin pregnancy. |

The clinical findings in the 14 cases which were incomplete have now become available. These show no evidence of error in location of the placental site.

## CHAPTER 8

## THE DIAGNOSIS OF PLACENTA PRAEVIA

The incidence of placenta praevia has been given variously by different authors (Table 4).

TABLE 4

| Author | Deliveries | Incidence |
|---|---|---|
| Arnell & Guerriero (1940) | 34,879 | 1 in 134 |
| Stander (1942) | 25,531 | 1 in 200 |
| Davies & Campbell (1946) | 40,961 | 1 in 126 |

In Mill Road Maternity Hospital in the years 1947-51 the incidence was 1 in 158 in 14,973 deliveries.

The dangers to both mother and baby of placenta praevia have led obstetricians to search for harmless methods of confirming the diagnosis, including radiological location of the placental site.

In these circumstances it is surprising that in the field of radiology whilst location of the placental site itself is widely discussed, there appears to be only one reference, by Reid in 1949, to the necessary corollary the radiographic definition of the lower uterine segment and particularly its junction with the upper uterine segment, for however accurately the position of the placental site can be reported, without similar accuracy in defining the position of the lower uterine segment, the diagnosis of placenta praevia cannot be made or excluded directly.

In 1939 Marshall described his observations on the lower uterine segment at or near term, as seen at Caesarean section. He found the segment formed between a-quarter and a-fifth of the total length of the uterus. The upper border of the lower segment he found difficult to define, because the transition from the thinner lower segment to the thicker corpus is a gradual one, forming a zone which may be 4-5 cms. in length. When the presenting part is deeply engaged, the anterior wall of the lower segment is partly abdominal and partly pelvic; late in labour it may be raised entirely into the abdomen. Owing to the inclination of the pelvic brim and the greater length of the posterior pelvic wall, the posterior part of the lower segment is nearly always confined to the true pelvis.

At or near term assuming accurate prediction of the placental site, it will not be possible in every case to state whether the placenta is attached entirely in the corpus or is encroaching on the lower segment, because definition of the junction of the lower uterine segment with the corpus will be approximate. Anteriorly the junction will be at about the level of the upper border of the symphysis pubis, posteriorly the junction will almost always be just below the level of the sacral promontory.

However, the presence of placenta praevia will usually mean that part of the placenta will be interposed between the presenting foetal part and the uterine wall together with the symphysis pubis anteriorly, or together with the sacral promontory posteriorly.

Normally the presenting part tends to fit centrally into the pelvic inlet in the erect position, and the placenta if praevia interferes with this relationship

displacing the presenting part from its normal central position.

Earlier in pregnancy, when examination for suspected placenta praevia is sometimes requested, the lower uterine segment has different anatomical boundaries, and probably lies entirely within the pelvis.

The frequency of malposition and malpresentation in placenta praevia is generally recognised, and as Stevenson showed in 1949 there is a high incidence of placenta praevia in transverse lie at or near term.

Diagnosis of Placenta Praevia by Soft Tissue Radiography.

1). Previous Methods.

Following the introduction of soft tissue radiography for location of the placental site by Snow and Powell, the method was at first used mainly for the exclusion of placenta praevia. If the placenta was not located in the "upper uterine segment" then cystography was carried out.

Thus Ude and Urner in 1935 and, together with Robbins, in 1938, affirmed that the method was of no value in the study of placenta praevia. Similarly Snow and Rosensohn in 1939, Brown and Dippell in 1940, Buxton, Hunt and Potter in 1942, and Stevenson in 1949, relied on cystography for the final diagnosis of placenta praevia. All these authors used the soft tissue method to locate the placenta, but where the placenta was suspected to be low in position, or was not located, cystography was carried out.

Golden and Ball first described in 1941 a radiological sign of placenta praevia, applicable only in head presentations. They noted that at or near term, the presenting foetal head was normally central in the pelvic

inlet, but where placenta praevia was present the head was usually displaced. Utilising both antero-posterior and lateral projections of the pelvis, they found that where the head was displaced a total distance of one-third the diameter of the head, this indicated placenta praevia. Bishop in 1945, and Crews, Hampton and Moore in 1949 also found this sign of value in placenta praevia.

In 1943 Smith recommended the diagnosing of placenta praevia where the placental shadow was not recognized in the body or fundus of the uterus. He also was of the opinion that the presence of a high presenting part on the erect lateral view in such a case confirmed the diagnosis of placenta praevia.

McCort, Davidson and Walton in 1944 re-affirmed the frequent displacement of the presenting part in placenta praevia and devised a system of mensuration. They found the normal distance from the foetal head to the sacral promontory to be 1.7 cms. and to the symphysis pubis to be 3 cms, but in placenta praevia these figures were raised to 3.4 cms. and 4.9 cms. respectively. Further examination of doubtful cases by pneumocystography was recommended.

In 1949 Reid drew attention to the necessity for recognising the junction between the lower and upper uterine segments in the diagnosis of placenta praevia by soft tissue radiography. His method of diagnosis of placenta praevia was based on these assumptions:-

(1). In vertex presentations the foetal head is normally symmetrically placed in the pelvic brim if the patient is standing up.

(2). The junction of the upper and lower uterine segments is usually in the neighbourhood of the pelvic inlet during the last 2-3 months of pregnancy.

(3). If implantation of the placenta extends onto the lower uterine segment the presenting foetal head will be displaced from its normal position at the brim.

He found that the normal foetal head to promontory and to symphysis distances are both 1.5 cms., but that in practice, with low implantation of the placenta one or both distances are seldom less than 2 cms., and frequently considerably more.

Reid claimed his technique applicable to all presentations but he found in head presentations the results were more accurate because the skull presented an easy landmark from which to measure. Breech presentations sometimes proved difficult to measure and transverse and oblique lies even more difficult.

2). The Present Technique for the Diagnosis of Placenta Praevia by Soft Tissue Radiography.

The following techniques have been developed during the present investigation, according to the stage of pregnancy.

(A). At or near term - during the last 6-8 weeks of pregnancy.

(1). The lateral radiograph of the abdomen.

In this radiograph in the presence of placenta praevia the thickening of the soft tissue shadow corresponding to the placenta is usually placed low down in the general outline of the uterus.

In major degrees of placenta praevia - degrees III and IV - this low position of the placenta is so obvious that the diagnosis can often be made from this radiograph alone. The "placental shadow" instead of being placed

Figure 49. Lateral radiograph of the abdomen in a case of anterior placenta praevia. The thickening of the soft tissue shadows corresponding to the placenta commences low down on the anterior uterine wall and involves the lower uterine segment. (Case No. 199).

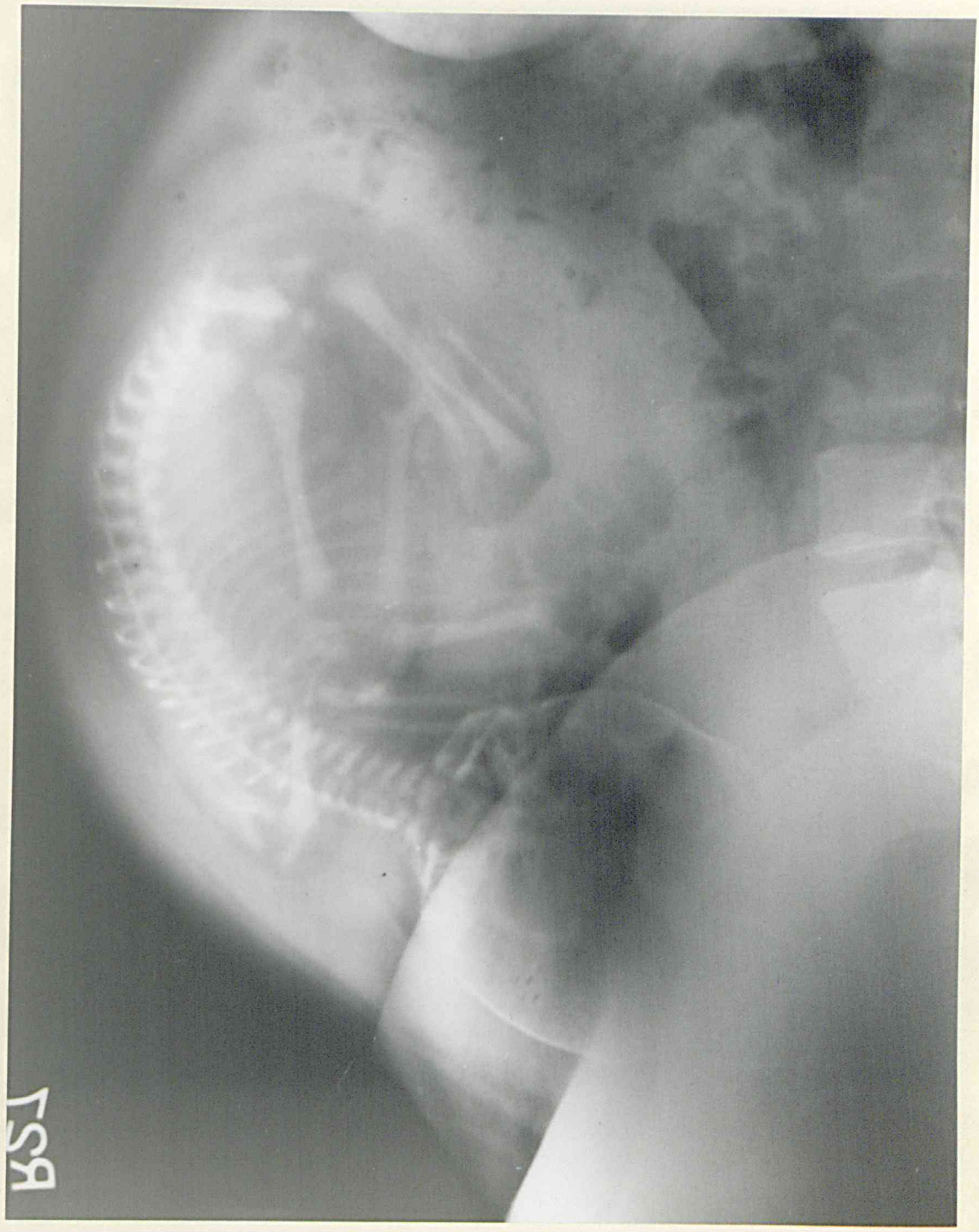


Figure 50. Lateral view of the abdomen in a case of posterior placenta praevia. The unilateral thickening of the soft tissue shadows corresponding to the placenta is thin and covers a wide area, reaching from the fundus down the posterior uterine wall to encroach on the lower uterine segment. (Case No. 269).

Figure 51. The same case as Figure 50. Amniography shows the filling defect due to the placenta reaches from the fundus to some distance below the sacral promontory. Further films of this patient are shown in Figures 54 and 55.

evenly on the anterior or posterior walls from the fundus to some distance above the symphysis or promontory, is found to start about or below the middle of the uterus and spread down over what is patently the lower uterine segment. Figures 49 and 2 show the typical appearance in anterior and posterior placenta praevia of this type.

Such a finding is not essential for diagnosis. In placenta praevia, especially of 1st and 2nd degree, the placenta may appear in the lateral radiograph to be relatively normally placed. This may be due to two factors. Firstly the placenta may be a little lower than normal, and secondly there may be a relatively thin placenta covering a greater than average area. In fact, the placenta may and does occasionally extend from the fundus of the uterus down the corpus onto the lower uterine segment reaching to the internal os or even overlying it. An example of this is illustrated, with confirmatory amniograph, in Figures 50, 51, 54 and 55.

From the lateral radiograph, therefore, it is possible to be relatively certain that placenta praevia is present, but it is not possible to exclude placenta praevia, except where the "placental shadow" is seen to be confined to the fundus of the uterus.

(2). <u>The erect lateral radiograph</u>.

Recognition that the placental site extends onto the lower uterine segment can only be confirmed or excluded with certainty when the findings from the lateral radiograph of the abdomen are considered together with the findings from this projection.

On this view the soft tissue shadows are more clearly defined posteriorly, and as it is known that the

Figure 52. Erect lateral radiograph of the pelvis in a case of posterior placenta praevia. The head is displaced forwards from the promontory and there is a marked thickening of the posterior "band-like" shadow. (Case No. 252).

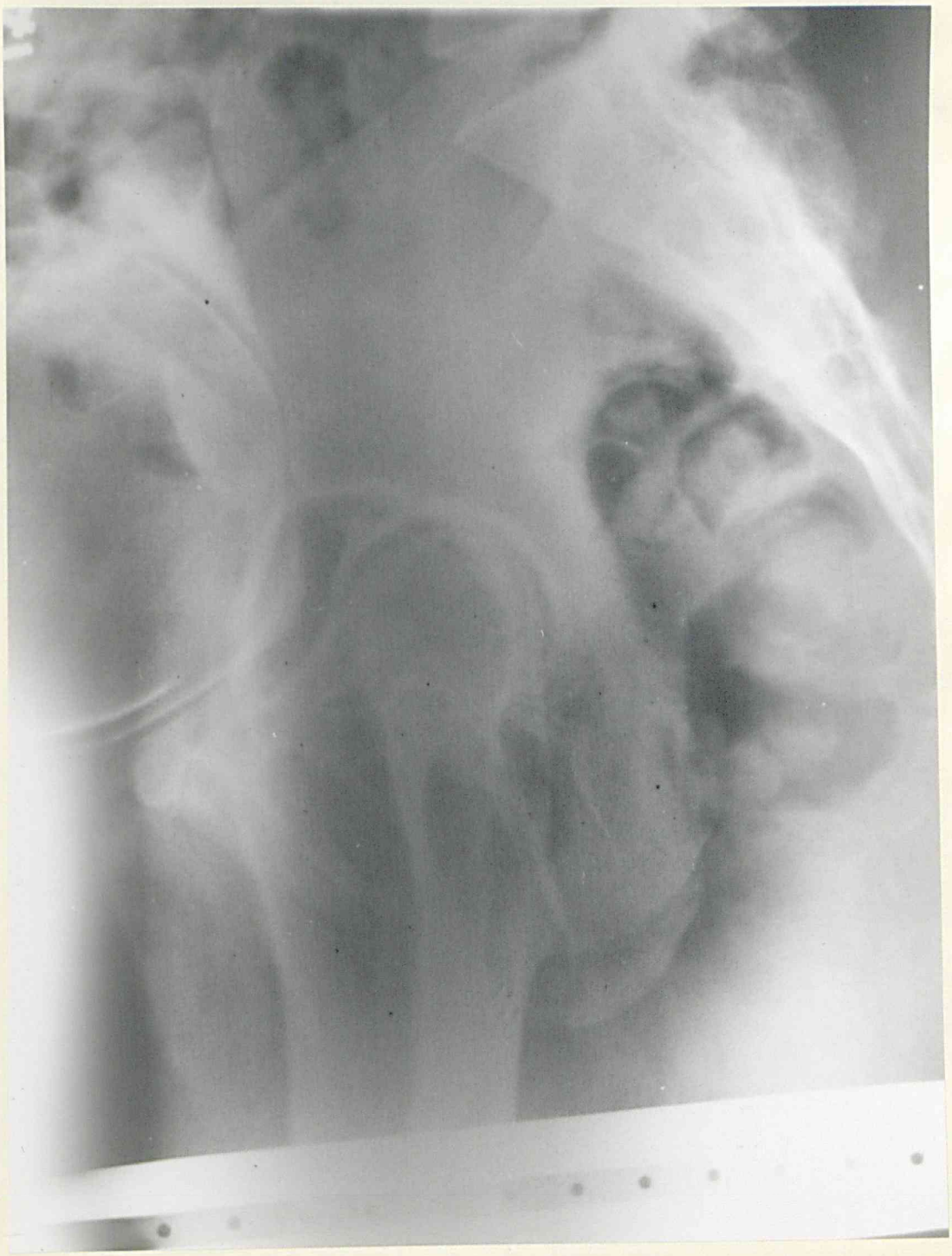


Figure 53. Erect lateral radiograph of the pelvis after amniography in a case of posterior placenta praevia. (The same case as Figure 52). The increased thickness of the "band-like" shadow is shown not to be due to liquor. Figures 52 and 53 are of the same case as Figures 1 and 2.

Figure 54. Erect lateral radiograph of the pelvis in a case of posterior placenta praevia. The head is displaced forwards from the promontory and there is thickening of the posterior "band-like" shadow. (Case No. 269).

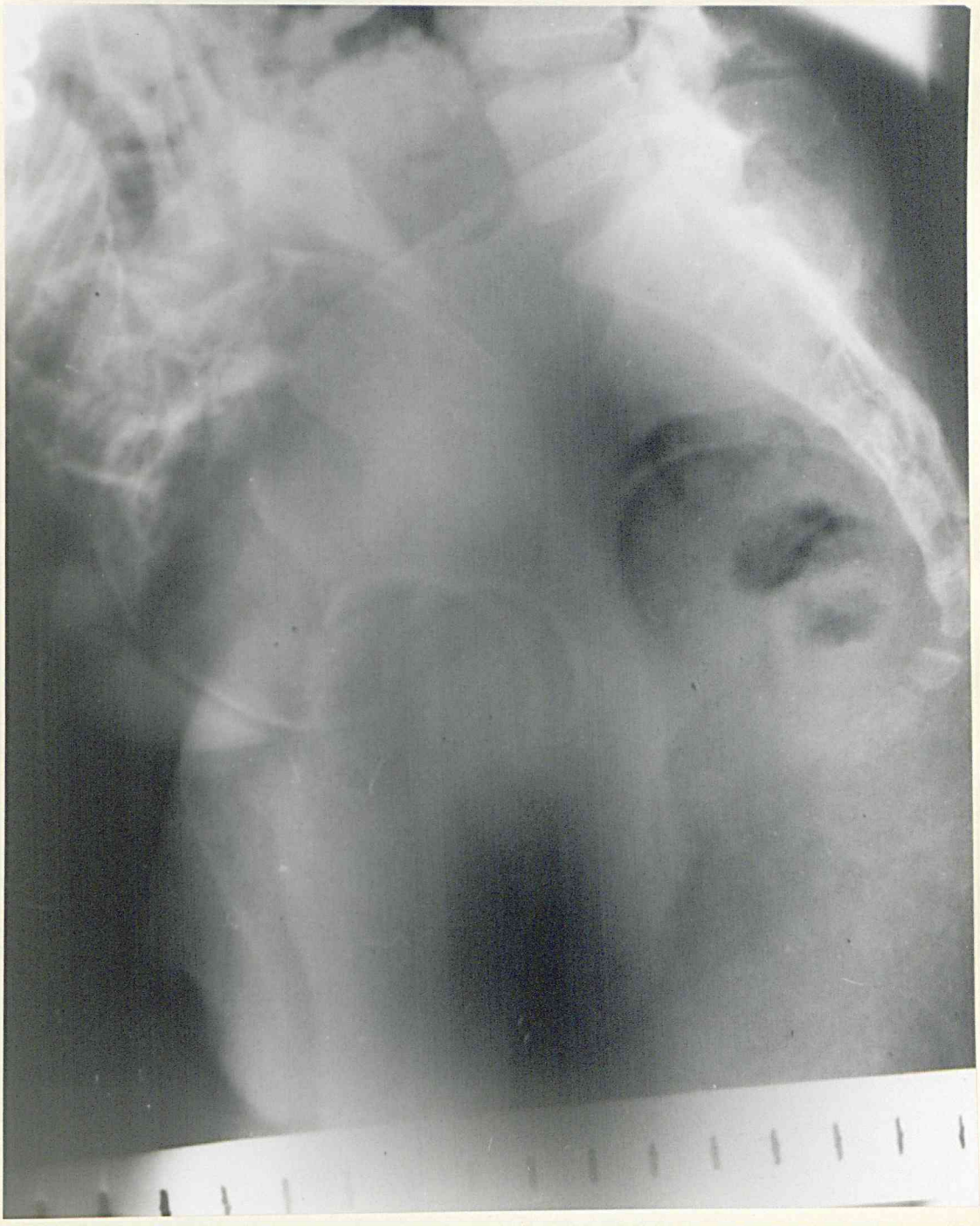


Figure 55. Erect lateral radiograph of the pelvis after amniography in a case of posterior placenta praevia (the same case as Figure 54). The increased thickness of the posterior "band-like" shadow is shown not to be due to liquor. Figures 54 and 55 are of the same case as Figures 50 and 51.

Figure 56. Erect lateral radiograph in a case of posterior placenta praevia. The marked thickening of the posterior "band-like" shadow is shown. (Case No. 236).

Figure 57. Erect lateral radiograph in a case of posterior placenta praevia. The marked thickening of the posterior "band-like" shadow is shown. (Case No. 149).

Figure 58. Erect lateral radiograph in a case of posterior placenta praevia. The marked thickening of the posterior "band-like" shadow is shown. (Case No. 204).

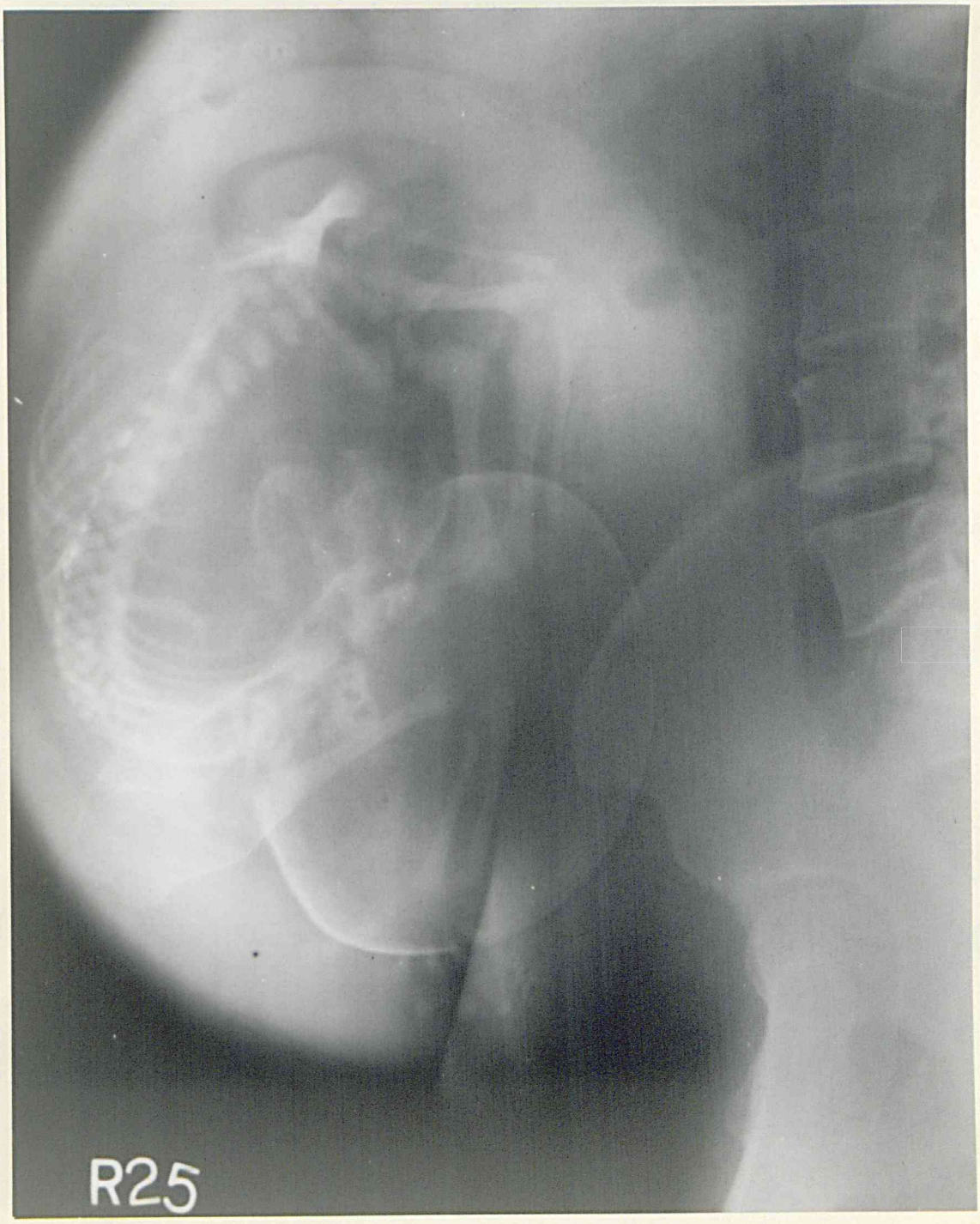



Figure 59. In this lateral view both the pelvis and the abdomen have been included on the film. The thickening of the posterior "band-like" shadow is shown to be continuous with a low posterior "placental" shadow. (Case No. 426).

Figure 60. Erect lateral radiograph in a case of anterior placenta praevia. The head is displaced backwards from the symphysis and there is a marked thickening of the anterior "band-like" shadow. (Recent case. Delivered by Caesarean section. Anterior placenta praevia type I).

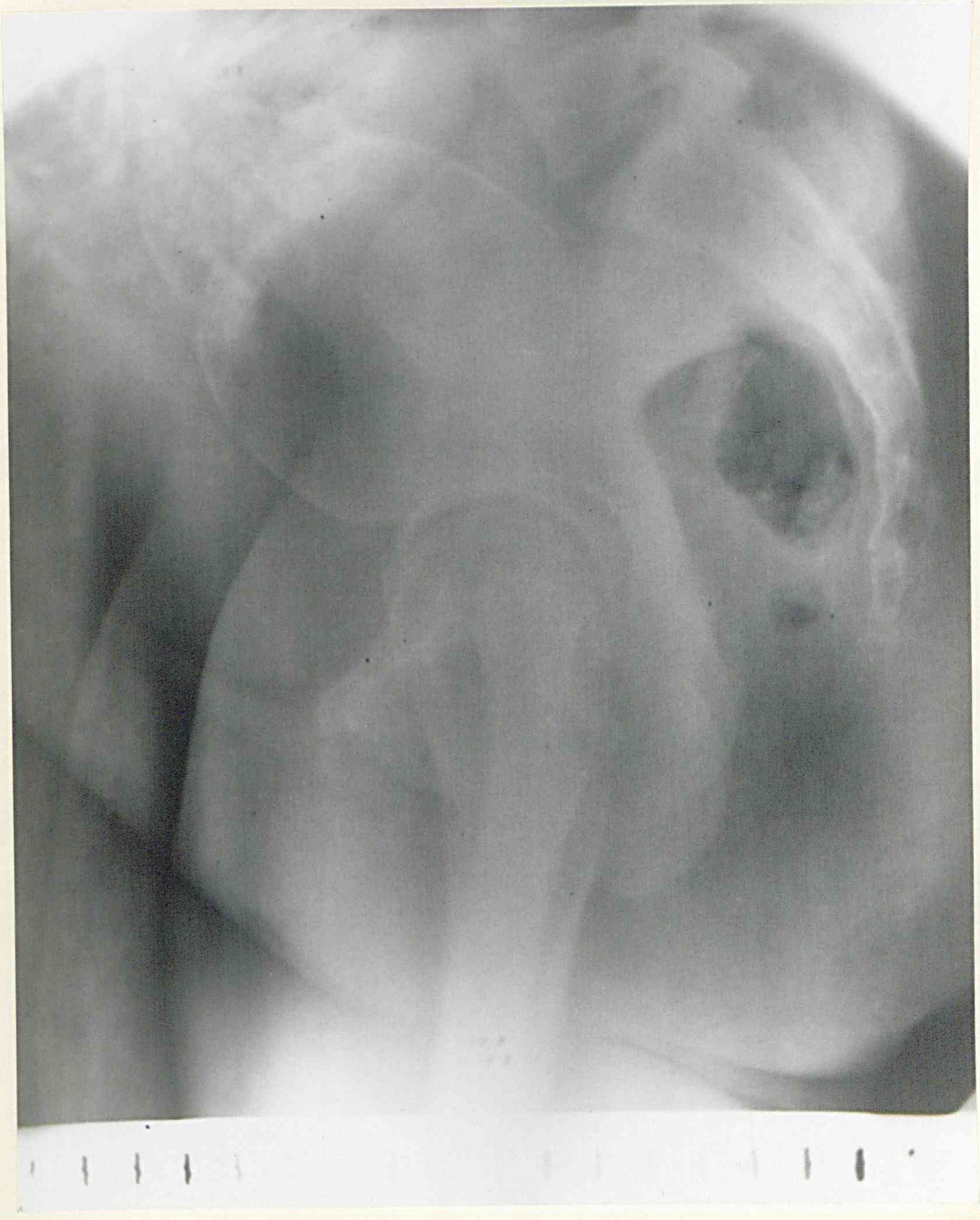


Figure 61. Erect lateral radiograph in a case of anterior placenta praevia. The head is displaced backwards from the symphysis and there is a marked thickening of the anterior "band-like" shadow. (Recent case. Delivered by Caesarean section. Anterior placenta praevia, Type II).

lower segment of the uterus is posteriorly almost invariably confined to the pelvis, interpretation is easier and more reliable in posterior placenta praevia. The placenta is revealed by an increased thickness of the "band-like" soft tissue shadow between the sacral promontory and the presenting foetal part. This will be best visualized in head presentations, and less well seen in breech presentations. The increased thickness of the "band-like" shadow will be confirmed in the lateral radiograph of the abdomen by the presence of the placenta posteriorly, frequently in low position, but occasionally, although posterior, relatively normal in position but thinner and covering a wider area.

Anteriorly, because of the less well-defined soft tissue shadows, the diagnosis will be less certain. Here, the normal thickness of the "band-like" shadow between the symphysis and the presenting part is fairly large compared to the posterior shadow. In addition the variable position of the junction of the upper and lower uterine segments anteriorly must be allowed for. Because of this, therefore, interposition of an anterior placenta praevia is less easily recognised. In most cases, especially anterior placenta praevia of types II, III and IV, the low position of the placental shadow on the lateral radiograph of the abdomen together with the increased thickness of "band-like" shadow, make diagnosis relatively certain. However, in type I doubt may exist.

Examples of these appearances in anterior and posterior placenta praevia are illustrated in Figures 52, 53, 54, 55, 56, 57, 58, 59, 60 and 61.

In addition to direct recognition of the soft tissue shadows, there is an additional useful sign, originally described by Golden and Ball in 1941 and later utilized by

Reid in 1949. It is that placenta praevia frequently causes displacement of the presenting foetal part from its normal central position in the pelvic inlet.

Although such displacement is almost always present in placenta praevia at or near term, the displacement is not diagnostic of placenta praevia, for it may arise from a variety of other causes:-

1). Full bladder and rectum.

2). Blood clot produced by accidental haemorrhage.

3). Pelvic tumours (Case No. 296).

4). Poor tone of the uterine muscle and laxity of the abdominal wall.

5). A large pelvic inlet or a presenting foetal head which is small in relation to the size of the inlet. This is especially so if the inclination of the pelvis is steep. Large antero-posterior diameter of the inlet is frequently associated with steep inclination in pelves of the anthropoid type.

6). In disproportion between the presenting part and the pelvic inlet.

7). Displacement may be present and remain unexplained.

8). Transverse or oblique lies occur, and are relatively common in placenta praevia, and no presenting part may be found in the pelvic inlet.

Many of these factors can be excluded, but in all cases this is not so. Therefore, whilst displacement is a pointer in the diagnosis of placenta praevia, alone it is not a certain sign.

Golden and Ball and later Reid relied on mensuration of the displacement for final diagnosis. The distances between the foetal skull and the symphysis pubis anteriorly and the sacral promontory posteriorly are measured. In

the presence of placenta praevia one or both of these distances are greatly increased.

Unfortunately, experience in the present series shows that:-

(A). In placenta praevia there is a marked tendency to transverse and oblique lies or high position of the presenting part although these may also occur when the placenta is located in the upper uterine segment. The mensuration system alone is therefore of little diagnostic value in malpresentations and in lies other than longitudinal.

(B). In one case (No.427) the head to symphysis and to promontory distances were less than 1.5 cms. in anterior placenta praevia of type II.

In no case in this series has implantation of the placenta on a lateral aspect of the uterus led to an erroneous diagnosis. It appears that such a location tends to produce displacement of the presenting foetal part both laterally and in an antero-posterior plane. Entirely lateral implantation of the placenta in the lower uterine segment has not been encountered.

Transverse and Oblique Lies - Special Consideration.

In transverse or oblique lie, no foetal parts may be present in relation to the pelvic inlet.

The erect lateral radiograph, in these cases, will be of little value except where some part of the foetus is recognisably so closely related to either the symphysis pubis or the sacral promontory that the possibility of placenta praevia can be excluded. If a foetal part is closely related to either of these bony parts, then displacement of the part is excluded either anteriorly or posteriorly

Figure 62. Erect lateral radiograph in a case of posterior placenta praevia. There are no foetal parts present in the pelvis because the foetus is lying obliquely. In this case a diagnosis of placenta praevia was made from the lateral radiograph of the abdomen. (Case No. 156).

Figure 63. Erect lateral radiograph in a case of anterior placenta praevia. There are no foetal parts present in the pelvis because the foetus is lying obliquely. In this case a diagnosis of anterior placenta praevia was made from the lateral radiograph of the abdomen. The same case as Figure 49.

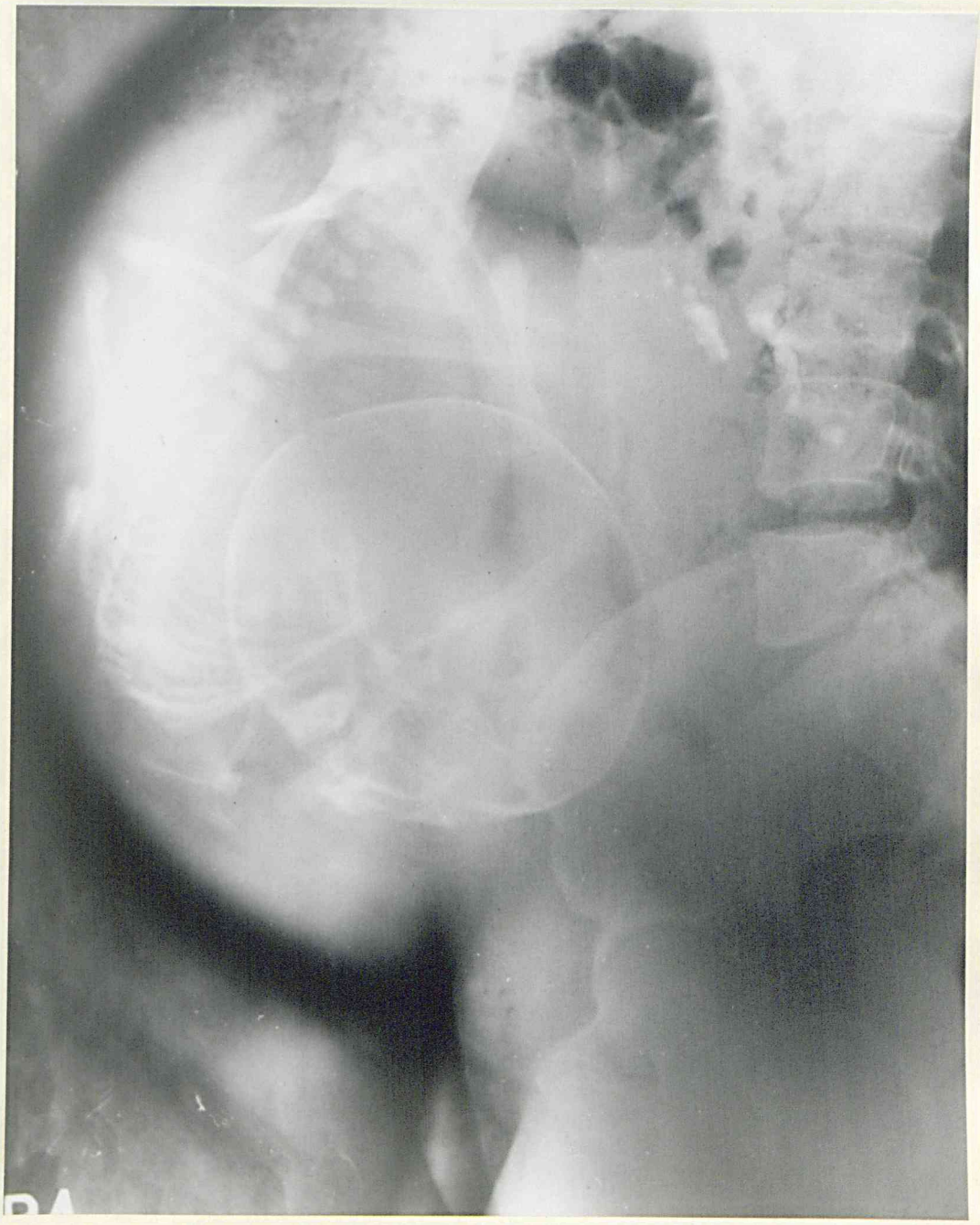


Figure 64. Lateral radiograph of the abdomen in a case of posterior placenta praevia. The foetus is lying transversely. The "placental shadow" is shown to be very low on the posterior uterine wall. The same case as Figure 62.

Figure 65. Lateral radiograph of the abdomen in a case of posterior placenta praevia. The foetus is lying transversely. The "placental shadow" is shown to be very low on the posterior uterine wall. (Case No. 202).

and similarly recognition of normal thickness of the soft tissue shadows will exclude placenta praevia in either the anterior or posterior boundary where the part lies.

Examples of oblique lie in placenta praevia are shown in Figures 62 and 63. In each case there are no foetal parts closely related to the pelvic inlet, and a diagnosis of placenta praevia was made from the lateral radiograph of the abdomen, co-related with the absence of foetal parts from the pelvic inlet.

In the remaining cases, recognition of the presence or absence of placenta praevia will depend entirely on interpretation of the lateral radiograph of the abdomen. This is unsatisfactory because there will be a group of cases where a definite diagnosis will not be possible.

Of this group a proportion will show such characteristic appearances that a reasonably confident diagnosis can be made: Figures 64 and 65 show examples of placenta praevia with transverse lie.

In a remaining proportion of cases, the diagnosis will remain in doubt, especially for placenta praevia types I and II. Such cases may subsequently on re-examination present characteristic findings. The lie may have changed, spontaneously or by version, so that with either a cephalic or breech presentation a diagnosis may be established. Where the diagnosis remains in doubt, such doubt must be clearly expressed in any report on the case.

Amniography may considerably aid diagnosis in such cases but the risks of the method must be weighed against the information which may be derived from it.

Firm diagnosis of placenta praevia therefore, depends on:-

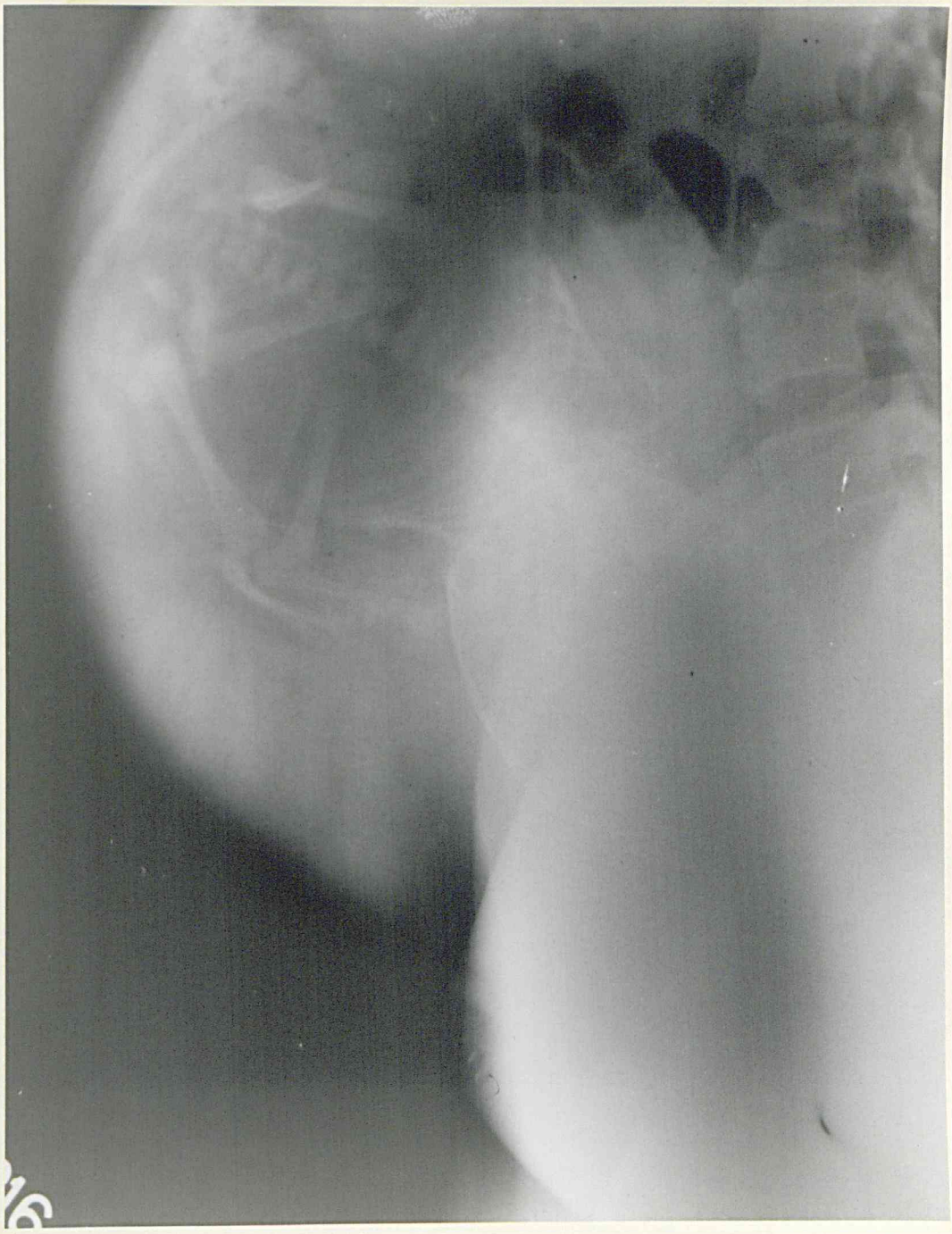


Figure 66. Lateral radiograph of the abdomen in a case of anterior placenta praevia. The "placental shadow" is shown to be very low on the anterior uterine wall. (Case No. 242).

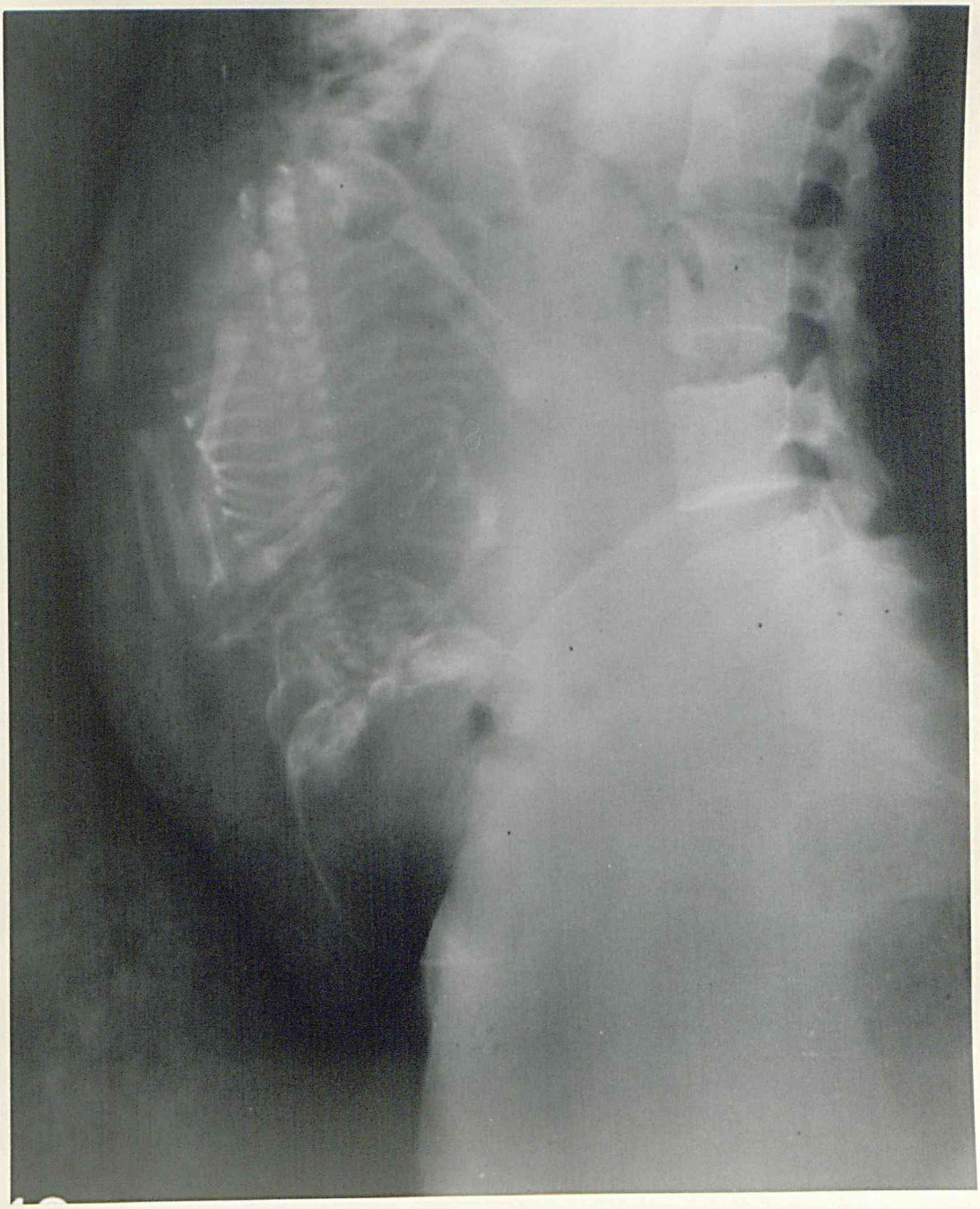


Figure 67. Lateral radiograph of the abdomen in a case of posterior placenta praevia. The "placental shadow" is shown to be very low on the posterior uterine wall. (Case No. 277).

Figure 68. Erect lateral radiograph of the pelvis in a case of anterior placenta praevia. (The same case as Figure 66). The head is displaced upwards and backwards from the symphysis and there is marked thickening of the anterior "band-like" shadows.

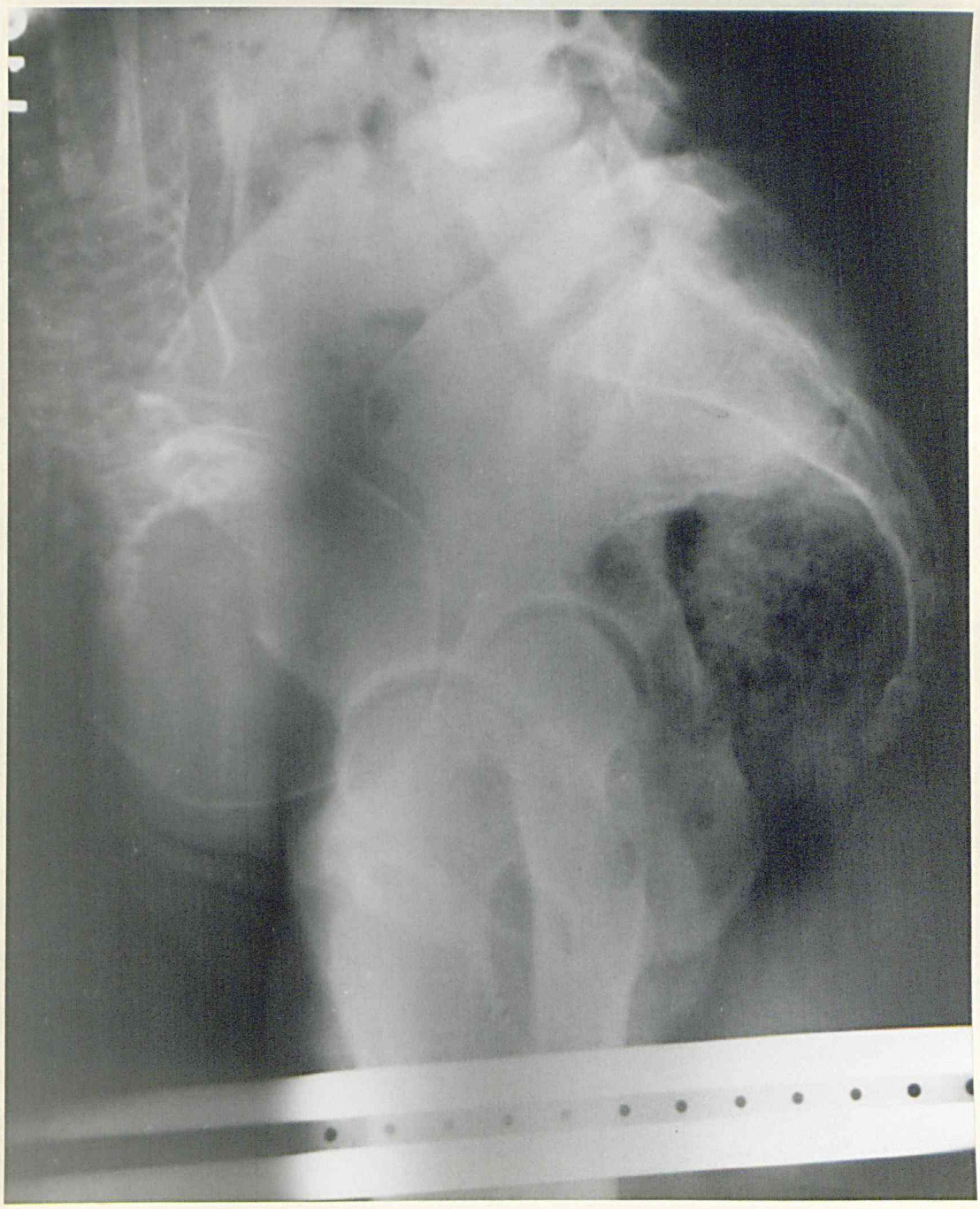


Figure 69. Erect lateral radiograph of the pelvis in a case of posterior placenta praevia. (The same case as Figure 67). The head is displaced forwards from the promontory and there is marked thickening of the posterior "band-like" shadow.

(1). Recognition of the placental site from the lateral or oblique radiographs of the abdomen (Figures 66 and 67).

(2). Recognition that the placental site is extending below the level of the pelvic inlet onto the lower uterine segment (Figures 68 and 69).

(3). Supporting evidence of displacement of the presenting part from the symmetrical position it usually occupies in the pelvic inlet. Such displacement may be measured and is usually in excess of 2 cms. and commonly considerably greater. Displacement alone is inadequate for diagnosis and must be correlated with recognition of the placental site.

It would appear, therefore, that a diagnosis of exclusion of placenta praevia would be certain in the majority of cases, the placental site being shown as normally placed in the corpus uteri, and the presenting part being centrally placed in the pelvic inlet. Previous reports and the results in this series support this contention.

If the factors named are strictly interpreted, errors in diagnosis by exclusion seldom occur. Of the 424 cases in this series, not one in which placenta praevia was excluded on radiological grounds was subsequently shown clinically to be placenta praevia.

Conversely the positive diagnosis of placenta praevia is likely to be less reliable, especially in anterior placenta praevia. The variable position of the junction of the upper and lower uterine segments anteriorly will limit the accuracy of diagnosis. However well-defined the placental site may be by radiological means, the other essential component for diagnosis, the position of the

Figure 70. Lateral radiograph of the abdomen in a case of posterior placenta praevia. The foetus is lying transversely. Although the films were taken early in pregnancy the "placental shadow" is shown to be very low on the posterior uterine wall. (Case No. 117).

junction of the upper and lower uterine segments, cannot at present be defined other than approximately.

Previous reports and the results in this series, therefore, show that the positive diagnosis of placenta praevia is less accurate than its exclusion.

Where practical, re-examination of doubtful cases may be requested as it frequently provides additional information, and subsequent review of the series of radiographs may enable a firm diagnosis to be made.

A clear statement of the exact radiological findings must be made, so that the obstetrician may, with all the information both radiological and clinical, decide the disposal of the case. The radiological report when location of the placenta is investigated by soft tissue radiography should therefore be divided into three groups:

(1). No radiological evidence of placenta praevia.

(2). Radiological appearances of placenta praevia.

(3). Radiological appearances of low implantation of the placenta possibly placenta praevia.

(B). Diagnosis of Placenta Praevia earlier in Pregnancy.

Sometimes examination for placenta praevia is requested earlier in pregnancy, at about 28-30 weeks. At this stage of pregnancy different criteria must be applied, since full and central engagement of the presenting foetal part may be present with placenta praevia.

In such cases recognition of the placental site from the lateral radiograph of the abdomen is essential. If its position can be clearly visualized as probably entirely within the corpus, or definitely involving the lower uterine segment, there is strong evidence for diagnosis. An illustration of this type of case is shown in Figure 70.

When practical, re-examination of doubtful cases made later in pregnancy will frequently give exact definition of the placental site and provide accurate diagnosis.

Results in the Present Series for the Diagnosis of Placenta Praevia by Soft Tissue Radiography.

There were 48 cases in which a radiological diagnosis of placenta praevia was made. Of these, three cases have not yet been delivered. The remaining 45 cases can be divided into two groups, the first group of 38 cases were all confirmed clinically, the second group of seven cases were not definitely clinically confirmed.

(A). Clinical and radiological evidence of Placenta Praevia.

(1). Case No. 1. M.K. 34 years. Multigravida 2.

X-rayed at 36 weeks. Delivered one week later by Caesarean section.

X-ray Findings.
Head presenting.
Very low posterior "placental" shadow.
Thick posterior "band-like" shadow.
Head displaced forwards from promontory.

Clinical Findings.
Small antepartum haemorrhage at 31 weeks. No further bleeding.
Caesarean section at 37th week by dates.
Posterior placenta praevia type III.
Weight baby 6 lbs. 5 ozs.

(2). Case No. 2. E.F. 38 years. Multigravida 2.

X-rayed at 30 weeks. Delivered 5 weeks later by Caesarean section.

X-ray Findings.
Transverse lie.
Very low posterior "placental" shadow, apparently reaching forward on to anterior wall above symphysis.
No foetal parts closely related to symphysis or promontory.

Clinical Findings.
Small repeated antepartum haemorrhage from 29th week.
Transverse and oblique lie.
Caesarean section at 35th week by dates.

Placenta praevia type IV situated chiefly on posterior wall.
Weight baby 6 lbs. 2 ozs.

This patient had had placenta praevia type IV with her previous pregnancy.

(3). Case No. 11. L.R. 26 years. Primigravida.

X-rayed at 36 and 38 weeks. Delivered by Caesarean section at 38 weeks.

X-ray Findings.
Erect lateral at 36 weeks shows head presenting.
Thick posterior "band-like" shadow recognised on this view, and placenta praevia suggested.
At 38 weeks low posterior "placental" shadow and repeat erect lateral again shows a thick posterior "band-like" shadow, with a high head, displaced forwards from the promontory.

Clinical Findings.
High head at 36 weeks.
Admitted because of X-ray findings.
Antepartum haemorrhage at 38 weeks.
Caesarean section at 38 weeks by dates.
Posterior placenta praevia type II.
Weight baby 6 lbs. 8 ozs.

(4). Case No. 15. F.W. 26 years. Primigravida.

X-rayed at 40 weeks. Delivered 4 weeks later by Caesarean section.

X-ray Findings.
Transverse lie.
Low anterior "placental" shadow.
No foetal parts related to promontory or symphysis.

Clinical Findings.
Small antepartum haemorrhage on two occasions; 40 weeks and 41 weeks.
Persistent transverse and oblique lies.
Caesarean section at 44th week (dates in this case appear incorrect).
Anterior placenta praevia type I.
Weight baby 7 lbs. 6 ozs.

(5). Case No. 29. C.H. 33 years. Multigravida 6.

X-rayed at 33 and 35 weeks. Delivered 8 weeks after first x-ray by Caesarean section.

X-ray Findings.
Head presenting on both occasions.
Low posterior "placental" shadow.
Forward and upward displacement of the head on each radiograph. Soft tissue shadows in the pelvis not visualized.

Clinical Findings:
Moderate antepartum haemorrhage on two occasions, 39 and 40 weeks.

Head persisting throughout.
Caesarean section at 41 weeks by dates.
Posterior placenta praevia type III.
Weight baby 6 lbs. 13 ozs.

(6). Case No. 47. E.D. 22 years. Primigravida.

X-rayed at 32 weeks. Delivered 6 weeks later by Caesarean section.

X-ray findings.
Breech presenting.
Very low anterior "placental" shadow.
Breech very high, both legs flexed.
Soft tissue shadows in pelvis, very difficult to interpret.

Clinical Findings.
Small antepartum haemorrhage 31 weeks.
Breech.
Caesarean section at 38 weeks by dates.
Anterior placenta praevia type III.
Weight baby 6 lbs. 2 ozs.

(7). Case No. 59. D.H. 24 years. Multigravida 2.

X-rayed at 40 weeks. Delivered 2 weeks later vaginally.

X-ray Findings.
Head presenting.
Low posterior "placental" shadow.
Head displaced forwards from promontory, and there is a thick posterior "band-like" shadow, on erect lateral view.
Erect lateral in labour shows central, full engagement of the head in the transverse position.

Clinical Findings.
No history of antepartum haemorrhage until onset of labour.
High prominent head until onset of labour, at 42 weeks by dates.
Vaginal delivery after artificial rupture of membranes.
At delivery vaginal palpation revealed posterior placenta praevia - type I.
Weight baby 8 lbs. 8 ozs.

(8). Case No. 63. E.O. 42 years. Multigravida 3.

X-rayed at 34 weeks. Delivered 5 weeks later by Caesarean section.

X-ray Findings.
Head presenting.
Low posterior "placental" shadow.
Marked thickening of posterior "band-like" shadow, with forward and upward displacement of the head from the sacral promontory.

Clinical Findings.
Small antepartum haemorrhage at 33 weeks.
High prominent head.
Caesarean section at 39 weeks by dates.
Posterior placenta praevia type III.
Weight baby 9 lbs. 2 ozs.

(9). Case No. 70. M.C. 24 years. Multigravida 2.

X-rayed at 35 weeks. Delivered 4 weeks later vaginally.

X-ray Findings.
Head presenting.
Normal posterior "placental" shadow.
Head displaced forwards and upwards from sacral promontory, and there is a thick posterior "band-like" shadow.

Clinical Findings.
Small antepartum haemorrhage at 34 weeks.
High prominent head.
Vaginal delivery at 39 weeks by dates.
Before delivery the placenta was palpated posteriorly to be a type I placenta praevia. At delivery it was found that an accessory lobe had been present in the lower segment.
Weight baby 8 lbs. 4 ozs.

(10). Case No. 65. C.B. 26 years. Multigravida 3,

X-rayed at 37 weeks. Delivered 4 weeks later vaginally.

X-ray Findings.
Head presenting.
Placenta posterior and low in position.
Erect lateral shows marked upward and forward displacement.of head. Soft tissue shadows poorly defined.

Clinical Findings.
Transverse lie at 36 weeks. Doubtful history of antepartum haemorrhage.
Head presenting in labour, at 41 weeks by dates.
Normal delivery, posterior placenta praevia type I, palpated vaginally before delivery.
Weight baby 7 lbs. 10 ozs.

(11). Case No. 117. A.N. 25 years. Multigravida 4.

X-rayed at 32 weeks. Delivered 5 weeks later by Caesarean section.

X-ray Findings.
Transverse lie.
All the foetus lies in the upper part of the uterine shadow and the placenta appears to be almost centrally placed in the lower segment with a larger posterior element.
Erect lateral shows no foetal parts in relation to pelvis.

Clinical Findings.
Antepartum haemorrhage at 32 and 36 weeks.
Unstable lie.
Caesarean section at 37 weeks by dates.
Posterior placenta praevia type III.
Weight baby 5 lbs. 10 ozs.

(12). Case No. 119. S.L. 30 years. Multigravida 5.

X-rayed at 31 weeks. Delivered 6 weeks later by Caesarean section.

X-ray Findings.
Head presenting.
Very low anterior "placental" shadow.
Haemorrhage too severe for further radiography.

Clinical Findings.
Antepartum haemorrhage at 31 weeks and more severely at 37 weeks.
Unstable lie.
Caesarean section at 37 weeks by dates.
Anterior placenta praevia type II.
Weight baby 5 lbs. 4 ozs.

(13). Case No. 138. M.P. 38 years. Multigravida 8.

X-rayed at 34, 36 and 39 weeks. Delivered 9 weeks after first x-ray by Caesarean section.

X-ray Findings.
Transverse lie, later head presenting.
Low anterior "placental" shadow, at 34 and 36 weeks.
Erect lateral at 39 weeks showed a very high head, which was central with respect to the pelvic inlet.

Clinical Findings.
Antepartum haemorrhage at 35 and 37 weeks.
Unstable lie.
Caesarean section at 43 weeks by dates.
Large anterior placenta praevia type II.
Weight baby 7 lbs. 15 ozs.

This patient had had placenta praevia with her previous pregnancy.

(14). Case No. 144. E.D. 26 years. Multigravida 2.

X-rayed at 34 and 36 weeks. Delivered 3 weeks after first x-ray by Caesarean section.

X-ray Findings.
Head presenting.
Low posterior "placental" shadow at 34 and 36 weeks.
Erect lateral at 36 weeks, showed a high head displaced forwards and a thick posterior "band-like" shadow.

Clinical Findings.
Antepartum haemorrhage at 34 weeks, subsequently repeated small antepartum haemorrhage on many occasions.

Very high head.
Caesarean section at 37 weeks by dates.
Posterior placenta praevia type III.
Weight baby 5 lbs. 15 ozs.

(15). Case No. 149. T.R. 29 years. Multigravida 2.

X-rayed at 36 weeks. Delivered 2 weeks later by Caesarean section.

X-ray Findings.
Head presenting.
Very low posterior "placental" shadow.
Markedly thick posterior "band-like" shadow.
Head is displaced forwards and upwards.

Clinical Findings.
Antepartum haemorrhage at 36, 37 and 38 weeks.
High prominent head.
Caesarean section at 38 weeks by dates.
Posterior placenta praevia type III.
Weight baby 6 lbs. 14 ozs.

(16). Case No. 156. L.M. 28 years. Multigravida 4.

X-rayed at 34 weeks. Delivered 1 week later by Caesarean section.

X-ray Findings.
Transverse lie.
"Placental" shadow appears almost central in lower segment, with a larger posterior element.
Erect lateral shows no foetal parts related to the pelvis.

Clinical Findings.
Antepartum haemorrhage at 34 weeks and subsequently repeated small antepartum haemorrhages.
Transverse and oblique lies.
Caesarean section at 35 weeks by dates.
Posterior placenta praevia type III.
Weight baby 5 lbs. 2 ozs.

(17). Case No. 199. C.K. 27 years. Multigravida 4.

X-rayed at 40 weeks. Delivered on same day by Caesarean section.

X-ray Findings.
Transverse lie.
Very low anterior "placental" shadow, almost centrally placed.
No foetal parts related to symphysis or promontory on erect lateral.

Clinical Findings.
Antepartum haemorrhage at 39 weeks. Repeated subsequently.
Caesarean section at 40 weeks by dates.
Anterior placenta praevia type IV.
Weight baby 5 lbs. 10 ozs.

(18). Case No. 202. E.D.T. 40 years. Primigravida.

X-rayed at 37 and 39 weeks. Delivered 3 weeks after 1st x-ray by Caesarean section.

X-ray Findings.
Transverse lie. Platypelloid pelvis.
Low posterior "placental" shadow, at 37 and 39 weeks.
Erect lateral on each occasion shows no foetal parts in relation to symphysis or promontory.

Clinical Findings.
No history of antepartum haemorrhage.
Persistent transverse lie.
Caesarean section at 40 weeks by dates.
Posterior placenta praevia type II.
Weight baby 6 lbs. 13 ozs.

(19). Case No. 204. M.T. 42 years. Multigravida 2.

X-rayed at 36 and 40 weeks. Delivered 4 weeks after first x-ray by Caesarean section.

X-ray Findings.
Head presenting.
Low posterior "placental" shadow.
Marked thickening of posterior "band-like" shadow, and forward and upward displacement of the head.

Clinical Findings.
No history of antepartum haemorrhage.
Unstable lie.
Caesarean section at 40 weeks by dates.
Posterior placenta praevia type IV.
Weight baby 7 lbs. 13 ozs.

(20). Case No. 210. W.W. 25 years. Multigravida 2.

X-rayed at 32 and 36 weeks. Delivered 5 weeks after first x-ray by Caesarean section.

X-ray Findings.
Head presenting.
Very low posterior "placental" shadow.
Patient considered unfit for erect lateral radiographs on account of recent haemorrhage.

Clinical Findings.
Antepartum haemorrhage at 32 weeks. Repeated subsequently on several occasions.
High prominent head.
Caesarean section at 37 weeks by dates.
Posterior placenta praevia type III.

(21). Case No. 223. C.B. 34 years. Multigravida 7.

X-rayed at 35 weeks. Delivered 1 week later by Caesarean section.

X-ray Findings.
Transverse lie.
Low anterior "placental" shadow.
Erect lateral shows no foetal parts closely related to symphysis or promontory.

Clinical Findings.
Antepartum haemorrhage at 35 weeks. Repeated subsequently.
Transverse lie.
Caesarean section at 36 weeks by dates.
Anterior placenta praevia type II.
Weight baby 5 lbs. 12 ozs.

(22). Case No. 228. M.M. 30 years. Multigravida 2.

X-rayed at 38 weeks. Delivered 2 weeks later by Caesarean section.

X-ray Findings.
Head presenting. Platypelloid pelvis.
Low posterior "placental" shadow.
Erect lateral shows thick posterior "band-like" shadow, and head displaced upwards and forwards.

Clinical Findings.
Antepartum haemorrhage at 33 and 37 weeks.
Previous Caesarean section for contracted pelvis.
Caesarean section at 40 weeks by dates.
Posterior placenta praevia type I.
Weight baby 6 lbs. 11 ozs.

(23). Case No. 234. M.D. 26 years. Multigravida 2.

X-rayed at 36 weeks. Delivered 1 week later by Caesarean section.

X-ray Findings.
Transverse lie on lateral radiograph of abdomen.
Very low anterior "placental" shadow.
Erect lateral shows thick "band-like" shadow, between head and symphysis.

Clinical Findings.
Antepartum haemorrhage at 36 weeks, subsequently small repeated antepartum haemorrhage.
Transverse lie.
Caesarean section at 37 weeks by dates.
Anterior placenta praevia type II.
Weight baby 6 lbs. 4 ozs.

(24). Case No. 236. E.M. 37 years. Multigravida 2.

X-rayed at 40 weeks. Delivered 1 day later by Caesarean section.

X-ray Findings.
Head presenting. Android type pelvis.
Posterior "placental" shadow, but thinner and more extensive than normal.
Erect lateral shows very thick posterior "band-like" shadow and the head displaced forwards from the promontory.

Clinical Findings.
No history of antepartum haemorrhage.
Contracted pelvis (previous craniotomy).
Caesarean section at 40 weeks by dates.
High head.
Posterior placenta praevia type II.
Weight baby 8 lbs. 12 ozs.

(25). Case No. 240. M.B. 32 years. Multigravida 3.

X-rayed at 38 weeks by dates, but in labour.

X-ray Findings.
Head presenting.
Very low anterior "placental" shadow.
Patient considered unfit for further radiographs on account of bleeding.

Clinical Findings.
Admitted with severe antepartum haemorrhage.
Caesarean section at 38 weeks.
Anterior placenta praevia, type II to III.
Weight baby 5 lbs. 13 ozs.

(26). Case No. 242. M.M.D. 26 years. Multigravida 2.

X-rayed at 36 weeks. Delivered 2 weeks later by Caesarean section.

X-ray Findings.
Head presenting.
Very low anterior "placental" shadow.
Erect lateral shows very thick anterior "band-like" shadow, with the head displaced upwards and backwards from symphysis.

Clinical Findings.
Antepartum haemorrhage at 36 weeks. Repeated subsequently in small amounts almost daily.
Caesarean section at 38 weeks.
Anterior placenta praevia type II.
Weight baby 6 lbs. 4 ozs.

(27). Case No. 245. M.C. 45 years. Primigravida.

X-rayed at 35 weeks. Delivered by Caesarean section on the same day.

X-ray Findings.
Head presenting.
Thin anterior "placental" shadow extending from fundus down to symphysis.
Erect lateral shows thick anterior "band-like" shadow, the head is high, but central.

Clinical Findings.
Myomectomy just before pregnancy.
Antepartum haemorrhage at 34 weeks.
Caesarean section at 35 weeks.
Thin anterior placenta with "tongue" of placenta extending down the anterior part of the lower segment to the internal os. (Type II).
Weight baby 6 lbs. 4 ozs.

(28). Case No. 248. M.K. 27 years. Multigravida 3.

X-rayed at 36 weeks. Delivered 4 weeks later, vaginally.

X-ray Findings.
Head presenting.
Low anterior "placental" shadow.
Erect lateral shows very high head, soft tissue outlines not well visualized.

Clinical Findings.
High head throughout pregnancy.
Antepartum haemorrhage at onset of labour at 40 weeks by dates.
Delivered by external version and bringing down of a leg for traction to control haemorrhage (estimated at 10 ozs.), subsequent delivery as breech. Anterior placenta praevia type II.
Weight baby 6 lbs. 8 ozs. Neonatal death.
Congenital heart lesion, incompatible with life.

(29). Case No. 252. A.B. 31 years. Multigravida 4.

X-rayed at 38 weeks. Delivered 2 weeks later by Caesarean section.

Amniography at 40 weeks. Delivered 2 days later by Caesarean section.

X-ray Findings.
At 38 weeks.
Head presenting.
Very low posterior "placental" shadow.
Erect lateral shows marked thickening of the posterior "band-like" shadow with displacement of the head forwards and upwards.
Amniography closely confirms the above findings, estimated to be a posterior placenta praevia type III or IV.

Clinical Findings.
Admitted because of X-ray findings at 38 weeks.
No history of antepartum haemorrhage.
Amniography.
Caesarean section at 40 weeks by dates.
Posterior placenta praevia type III.
Weight baby 6 lbs. 15 ozs.

(30). Case No. 269. E.W. 36 years. Multigravida 4.

X-rayed at 36 weeks.

Amniography at 36 weeks. Delivered 3 days later by Caesarean section.

X-ray Findings.
Head presenting.
Posterior "placental" shadow extending from fundus to below promontory.
Erect lateral shows thickening of posterior "band-like" shadow with forward displacement of head.
Amniography closely confirms the above findings.
Posterior placenta praevia probably type II.

Clinical Findings.
Antepartum haemorrhage at 35 weeks.
Mobile prominent head.
Amniography. No further bleeding.
Caesarean section at 36 weeks.
Posterior placenta praevia type II.
Weight baby 6 lbs. 3 ozs.

(31). Case No. 277. D.D. 29 years. Multigravida 2.

X-rayed at 30 weeks. Delivered 3 weeks later by Caesarean section.

X-ray Findings.
Head presenting.
Very low posterior "placental" shadow.
Erect lateral shows marked forward and upward displacement of head. Soft tissue shadows in pelvis are well visualized.

Clinical Findings.
Antepartum haemorrhage at 29 weeks.
Caesarean section at 33 weeks.
Posterior placenta praevia type III.
Weight baby 4 lbs. 8 ozs.

(32). Case No. 278. A.S. 33 years. Multigravida 7.

X-rayed at 37 weeks. Delivered 3 weeks later vaginally.

X-ray Findings.
Transverse lie.
Low anterior "placental" shadow.
Erect lateral shows no foetal parts near to promontory or symphysis.

Clinical Findings.
Antepartum haemorrhage at 36 weeks.
Transverse lie.
Vaginal delivery as a vertex at 40 weeks by dates.
Vaginal palpation during artificial rupture of membranes revealed anterior placenta praevia type I.
Weight baby 7 lbs. 6 ozs.

(33). Case No. 303. M.H. 32 years. Multigravida 5.

X-rayed at 40 weeks in labour.

X-ray Findings.
Head presenting.
Low anterior "placental" shadow.
Erect lateral shows central full engagement of the head.

Clinical Findings.
Antepartum haemorrhage at 39 weeks.
Artificial rupture of membranes, when anterior placenta praevia type I palpated.
Weight baby 5 lbs. 14 ozs.

(34). Case No. 317. E.H. 34 years. Multigravida 2.

X-rayed at 34 weeks. Delivered 3 weeks later by Caesarean section.

X-ray Findings.
Breech presenting.
Very low anterior "placental" shadow.
Erect lateral shows thick anterior "band-like" shadow which is ill-defined.
The breech is displaced upwards from the pelvis.

Clinical Findings.
Antepartum haemorrhage at 30 weeks. Patient Rh negative with antibodies.
Unstable lie.
Caesarean section at 37 weeks.
Anterior placenta praevia type III.
Weight baby 5 lbs. 2 ozs. Exchange transfusion.

(35). Case No. 237. M.B. 27 years. Multigravida 2.

X-rayed at 33 weeks. Delivered 4 weeks later by Caesarean section.

X-ray Findings.
Transverse lie.
Very low anterior "placental" shadow.
Erect lateral shows no foetal parts closely related to symphysis or promontory.

Clinical Findings.
Transverse lie.
Antepartum haemorrhage at 37 weeks.
Caesarean section at 37 weeks.
Anterior placenta praevia type III.
Weight baby 6 lbs. 15 ozs.

(36). Case No. 400. N.M. 25 years. Multigravida 2.

X-rayed at 41 weeks. Delivered 2 days later by Caesarean section.

X-ray Findings.
Head presenting.
Very low posterior "placental" shadow.
Thick posterior "band-like" shadow with marked forward displacement of the head in the erect lateral radiograph.

Clinical Findings.
No history of antepartum haemorrhage.
Unstable lie.
Caesarean section at 41 weeks.
Posterior placenta praevia type III.
Weight baby 5 lbs. 14 ozs.

(37). Case No. 426. M.H. 27 years. Multigravida 2.

X-rayed at 36 weeks. Delivered 4 weeks later by Caesarean section.

X-ray Findings.
Transverse lie.
Very low posterior "placental" shadow.
No foetal parts in close relation to symphysis or promontory.

Clinical Findings.
No history of antepartum haemorrhage.
Unstable lie. Transverse lie.
Caesarean section at 40 weeks.
Placenta praevia, type IV, mainly posterior.
Weight baby 7 lbs. 9 ozs.

(38). Case No. 427. A.W. 34 years. Multigravida 3.

X-rayed at 36 weeks. Delivered 1 day later by Caesarean section.

X-ray Findings.
Head presenting.
Low "placental" shadow on anterior and left lateral walls.
Head central in both antero-posterior and lateral planes.
Head 1.1 cms. from symphysis pubis, and 1.3 cms. from sacral promontory.
Radiologically thought to be possibly placenta praevia type I, mainly left lateral wall, and to some extent anterior.

Clinical Findings.
Antepartum haemorrhage at 36 weeks. Moderate toxaemia.
Caesarean section at 36 weeks.
Anterior placenta praevia type II.
Weight baby 5 lbs. 5 ozs.

These findings are confusing from a radiological point of view, as the lower segment was stated to be quite thick and it seems unlikely that the junction of the lower and upper uterine segments would be above the symphysis.

(B). Radiological Evidence of Placenta Praevia, but no definite Clinical Confirmation (7 cases).

(1). Case No. 19. E.F. 31 years. Multigravida 2.

X-rayed at 40 weeks. Delivered 5 weeks later vaginally.

X-ray Findings.
Transverse lie.
Low anterior "placental" shadow.
Erect lateral shows no foetal part closely related to symphysis or promontory.

Clinical Findings.
Antepartum haemorrhage at 39 weeks.) Dates appear
Transverse lie at 40 weeks. ) in error.
Normal vaginal delivery at 45 weeks by dates.
Total blood loss during labour 38 ozs. (no indication of amount in each stage of labour).
Weight baby 5 lbs. 1 oz.

(2). Case No. 61. E.M. 30 years. Multigravida 3.

X-rayed at 40 weeks. Delivered 2 weeks later by Caesarean section.

X-ray Findings.
Head presenting.
Low posterior "placental" shadow.
Erect lateral showed thick posterior "band-like" shadow, with forward and upward displacement of the head.

Clinical Findings.
No history of antepartum haemorrhage.
Repeat Caesarean section for contracted pelvis, at 42 weeks. Weight baby 6 lb. 4 ozs.
Placenta posterior, lower limit not defined due to technical difficulties during the operation.

(3). Case No. 140. F.K. 36 years. Multigravida 8.

X-rayed at 29 weeks. Delivered 10 weeks later by Caesarean section.

X-ray Findings.
Head presenting.
Appearance of very low posterior "placental" shadow.
Erect lateral shows high head, soft tissue shadows not visualized.

Clinical Findings.
Antepartum haemorrhage at 29 weeks.
Caesarean section for revealed accidental haemorrhage at 39 weeks.
Marked dextro-rotation of uterus, with very large veins and venous plexuses.
Placental site posterior lower border not palpated because of operational difficulties.
Weight baby 4 lbs. 13 ozs.

(4). Case No. 145. E.H. 30 years. Multigravida 6.

X-rayed at 35 weeks. Delivered 6 weeks later vaginally.

X-ray Findings.
Head presenting.
Low posterior "placental" shadow.
Thick posterior "band-like" shadow and head displaced upwards and forwards on erect lateral.

Clinical Findings.
Previous Caesarean section.
Very high head during pregnancy. No antepartum haemorrhage.
Normal delivery at 41 weeks.
Manual removal placenta, position not given other than posterior.
Weight baby 7 lbs. 1 oz.

(5). Case No. 162. Multigravida 3. A.M.

X-rayed at 39 weeks. Delivered 2 weeks later vaginally.

X-ray Findings.
Transverse lie.
Very low anterior "placental" shadow.
Erect lateral radiographs not taken.

Clinical Findings.
Transverse lie at 38 weeks.
Later became stable as vertex.
Normal delivery at 41 weeks by dates. No abnormal bleeding during labour.
Weight baby 7 lbs. 8 ozs.

(6). Case No. 396. E.W. 28 years. Multigravida 2.

X-rayed at 37 weeks. Delivered 1 week later vaginally.

X-ray Findings.
Head presenting.
Low posterior "placental" shadow.
Thickening of posterior "band-like" shadow and forward displacement of head on erect lateral.
Displacement of head from promontory is 3 cms.

Clinical Findings.
High head at 37 weeks. No definite history of antepartum haemorrhage.
Normal vaginal delivery at 38 weeks. No abnormal bleeding during labour.
Weight baby 5 lbs. 11 ozs.

(7). Case No. 399. E.E. 31 years. Multigravida 5.

X-rayed at 34 weeks. Delivered 5 weeks later vaginally.

X-ray Findings.
Head presenting.
Low posterior "placental" shadow, head displaced forwards on erect lateral and there is considerable thickening of the posterior "band-like" shadow.

Clinical Findings.
(Placenta praevia with 3rd pregnancy).
Antepartum haemorrhage at 34 weeks, and subsequently repeated small antepartum haemorrhages.
High prominent head.
Normal vaginal delivery at 39 weeks. No abnormal bleeding during labour.
Weight baby 6 lbs.

(C). Radiological Evidence of Placenta Praevia - not yet delivered (3 cases).

(1). Case No. 329. B.M. 24 years. Multigravida 3.

X-rayed at 33 weeks. Not yet delivered.

X-ray Findings.
Head presenting.
Low posterior "placental" shadow.
Erect lateral shows thick posterior "band-like" shadow, with forward and upward displacement of the head.

Clinical Findings.
Antepartum haemorrhage at 33 and 36 weeks.
High free head.

(2). Case No. 353. L.V. 24 years. Multigravida 2.

X-rayed at 34 weeks. Not yet delivered.

X-ray Findings.
Head presenting.
Fairly low posterior "placental" shadow.
Erect lateral shows thick posterior "band-like" shadow and head displaced forwards 2.5 cms. from promontory.

Clinical Findings.
No history of antepartum haemorrhage up to 36th week.
High mobile head.

(3). Case No. 428. E.F. 37 years. Multigravida 4.

X-rayed at 34 weeks. Not yet delivered.

X-ray Findings.
Transverse lie.
Very low anterior "placental" shadow.
No foetal parts closely related to symphysis or promontory.

Clinical Findings.
Antepartum haemorrhage at 36 weeks.
Transverse lie.

Placenta Praevia. Tabulation of Results.

The results in all cases where a radiological opinion was sought on the presence or absence of placenta praevia can be summarized as follows:-

(1). Radiological Positive Diagnosis of Placenta Praevia.

| | |
|---|---|
| Total . . . . . | 48 cases. |
| Not yet delivered . . . | 3 cases. |
| | 45 cases. |

Clinical confirmation of placenta praevia.

| | |
|---|---|
| Total . . . . . | 38 cases (84%). |
| Not clinically confirmed . | 7 cases (16%). |

Of the confirmed cases the location of the placenta was as follows:-

| | |
|---|---|
| Anterior placenta praevia . . | 16 cases. |
| Posterior placenta praevia . . | 22 cases. |

(2). Radiological exclusion of Placenta Praevia - 376 cases.

None of these cases was subsequently found clinically to have placenta praevia.

(3). Presentation of the Foetus in Placenta Praevia.

| | |
|---|---|
| Head presenting . . . . | 25 cases (64%). |
| Breech presenting . . . . | 2 cases (5%). |
| Transverse and oblique lies . | 12 cases (30%). |
| | 39 cases |

One case presented as a transverse lie and later as a head.

The figures show the high incidence of transverse and oblique lie in placenta praevia.

(4). There were 12 cases in which the diagnosis of placenta praevia presumed on clinical grounds was confirmed radiologically before any antepartum haemorrhage occurred.

This is of very considerable clinical importance.

(5). There were no maternal deaths amongst the cases of placenta praevia.

(6). Only one foetus was lost. This is in part due to the fact that some cases with very severe antepartum haemorrhage for whom immediate treatment was required, were considered unfit for radiological examination. In these cases X-ray diagnosis is often not required.

(7). In two of the cases of placenta praevia there was a history of placenta praevia in the preceding pregnancy.

TABLE 5

| Author | Total | Upper Uterine Segment | | | | Lower Uterine Segment | |
|---|---|---|---|---|---|---|---|
| | | Ant. | Post. | Lat. | Fundal | Ant. | Post. |
| Holzapfel* (1896) | 107 | 35.5% | 33.6% | 23.4% | 6.6% | - | - |
| Gusserow* (1866) | 100 | 41 | 37 | 13 | 9 | - | - |
| Dippel & Brown (1940) | 107 | 103 | | - | - | 23 | 3 |
| Buxton Hunt & Potter (1942) | 93 | 74 | | - | - | 19 | |
| Stander (1942) | 100 | 49 | 40 | 2 | 3 | 16 | |
| Torpin & Holmes (1943) | 363 | 163 | 200 | - | - | - | - |
| McCort Davidson & Walton (1944) | 126 | 101 | | - | - | 25 | |
| Reid (1949) | 339 | 132 | 167 | - | - | 16 | 24 |
| Reid (1951) | 487 | 215 | 224 | - | 16 | 32 | |
| Stevenson (1949) | 474 | 43.8% | 31.6% | 9.7% | 7.4% | 7.5% | |

* From anatomical studies of the placenta in situ.

## CHAPTER 9

## THE SITE OF PLACENTAL IMPLANTATION AND THE RELATIONSHIP OF THE FOETUS TO IT

Implantation of the placenta in the lower uterine segment has been shown to favour mal-presentation. Radiological location of the placenta has shown that there is also a relationship between the site of the placenta when in the upper segment and the presentation of the foetus.

### (1). The Site of Placental Implantation.

Several workers have undertaken research into this point as set out in Table 5.

When the placenta is implanted in the upper uterine segment, it is most commonly mainly on the anterior or posterior wall. The fundus and lateral walls are much less often the site of implantation.

It is of interest that in 1938 Torpin developed an ingenious method of studying the site of implantation of the placenta. He found that if the placenta and membranes were delivered carefully, during the third stage of labour, it was possible to deduce the site at which the placenta had been attached. By filling the amniotic sac carefully with water, and then immersing the placenta and distended sac in a tank of water, the cavity of the uterus was simulated by the distended sac. Its contours could be recognised as the respective parts of the uterine cavity and thus the placental site located anatomically. Torpin's findings can be summarized thus:-

(A). The commonest placental sites are on the anterior and posterior uterine walls.

(B). Placenta praevia is more common than clinical findings suggest.

(C). Study of sacs from abortions shows a tendency to an atypical placental site, e.g. cornual or cervical.

The findings in 376 pregnancies in the present series are given in Table 6.

TABLE 6.

Location of the Placenta in the Upper Uterine Segment.

All presentations 376 Cases.

| Placental Site | Number | Percentage |
|---|---|---|
| Anterior | 147 | 39 |
| Antero-lateral | 9 | 2 |
| Posterior | 132 | 35 |
| Postero-lateral | 0 | 0 |
| Lateral | 4 | 1 |
| Fundal | 29 | 8 |
| Fundal Cornual | 46 | 12 |
| Twin Pregnancy (excluded) | 9 | 2 |

In general these results follow closely those of other workers. In the upper uterine segment the placenta is most commonly implanted either on the anterior or posterior uterine wall.

(2). Relationship of the Foetus to the Placental Site.

Many authors who have reported their results of soft tissue radiography of the placental site have remarked on the frequency with which the foetus faces the placenta and appear to have utilized this knowledge to deduce the site of the placenta. Snow and Rosensohn, Buxton, Hunt and Potter, Smith, and Bishop all reported that the ventral surface of the foetus was most frequently opposed to the placenta, but Dippel and Brown found otherwise.

Torpin and Holmes reported in 1943 that where the placenta was anterior, occipito-anterior positions were only one half as common as when the placenta was implanted posteriorly; but conversely with an anterior placenta occipito-posterior positions were more than twice as common as occipito-anterior positions. Occipito-transverse positions were 50 per cent. more common with anterior than with posterior implantation of the placenta. Most of their 363 cases on whom the study was made were x-rayed in the first stage of labour, but Reid found that antenatally too posterior implantation of the placenta favoured anterior position of the occiput.

The findings in 281 cases in the present series are given in Table 7.

TABLE 7.

| | Placenta Anterior 150 cases | Placenta Posterior 131 cases |
|---|---|---|
| Foetus facing placenta | 21% | 37% |
| Foetus back to placenta | 20% | 13% |
| Foetus side to placenta | 58% | 50% |
| Foetus freely mobile | 1% | - |

The conclusion drawn from this series is that there is always a greater chance that the foetus will not face the placenta. This is because, as shown in Table 8, in head presentations the commonest position is occipito-transverse, in which case the foetal side is nearest to a placenta on the anterior or posterior wall. Occipito-transverse is the commonest position of the head for it is determined by the shape of the bony pelvic brim. Table 8 details a control series of 158 normal primigravida at or near term x-rayed in the erect lateral position. In all the cases the head was fully or almost fully engaged.

TABLE 8.

| Position | Percentage | |
|---|---|---|
| Occiput Transverse | 54 | |
| Oblique Occipito-anterior | 30) | ) Anterior 38% |
| Occipito-Anterior | 8) | |
| Oblique Occipito-posterior | 5) | ) Posterior 8% |
| Occipito-posterior | 3) | |

Although Table 7 shows that when the placenta is posterior the foetus has a greater tendency to face it, this was to be expected since Table 8 shows occipito-anterior occur more commonly than occipito-posterior positions.

These findings may be summarized as follows:-

(1). Contrary to the reports of many authors results in this series show that there is always a greater chance that the foetus will not face the placenta.

(2). The commonest finding in this series was that the side of the foetus was nearest to the placenta.

(3). Effect of Placental Siting on the Lie and Presentation of the Foetus.

In 1949, 1950 and 1951 Stevenson published three papers drawing attention to the significance of the placental site in the causation of malpresentation notably breech presentation and transverse lie. These papers require detailed consideration.

Transverse or Oblique Lie.

Stevenson located the placental site by soft tissue radiography in 52 cases of transverse or oblique lie in the last ten weeks of pregnancy. In 92 per cent. the location of the placental site was either in the fundus or in the lower segment of the uterus, 48 per cent. being in the fundus and 44 per cent. being in the lower uterine segment. In only 7.6 per cent. was the placenta situated in the body of the uterus proper.

Of the 52 cases, spontaneous version occurred in 27 per cent., external version was performed in 40.4 per cent., and 32.6 per cent. were allowed to remain transverse or oblique.

Table 9 compares the placental sites in the 52 cases with the sites in Stevenson's 474 cases of all presentations.

TABLE 9

| | Total | Fundal | Body of Uterus | Lower Uterine Segment |
|---|---|---|---|---|
| Transverse Lie | 52 | 48.2% | 7.6% | 44.2% |
| All Presentations | 474 | 7.4% | 85.1% | 7.5% |

Stevenson therefore suggested that transverse or oblique lie near to term was frequently due to the site of implantation of the placenta. Where the placenta was implanted in one or other pole (fundus or lower uterine segment) this reduced the vertical length of the cavity and displaced the foetus from the longitudinal lie giving rise to transverse or oblique lie. He admitted that anterior implantation of the placenta might also permit transverse or oblique lie, especially where the anterior abdominal wall was lax, but he concluded that this would occur rarely, since the displacing factor - the placenta implanted in a uterine pole - would be absent. Posterior implantation of the placenta would seldom, if ever, permit transverse lie, because in addition to the absence of the displacing factor, the maternal spine and rigid structures of the posterior abdominal wall, would not permit the necessary "passive expansibility".

Stevenson claimed that displacement of the foetal pole would result in transverse or oblique lie with increasing frequency in multigravida, since greater parity was commonly associated with laxity of the uterine and anterior abdominal walls, facilitating malpresentation. The average parity of the cases with fundal implantation of the placenta was 4.38, and with implantation in the lower uterine segment 2.97.

Thus, in fundal implantation, the high degree of parity seemed to him a factor in the production of transverse and oblique lie. With implantation in the lower uterine segment the high degree of parity was not as necessary for the production of transverse or oblique lie.

Stevenson therefore claimed that in addition to the traditional causes of transverse lie the site of the

placental implantation played a part in the aetiology.

Breech Presentation.

In 1950 Stevenson recorded the location of the placental site as shown by soft tissue radiography in 76 cases of breech presentation found at or near term. In all of these cases the placenta was implanted over one or other cornu of the uterus. In 71 per cent. it was over the left cornu and in 29 per cent. over the right cornu.

In between one-third and one-half of Stevenson's cases the placental site was confirmed either at Caesarean section or vaginally at delivery and no error was detected.

These figures were, he suggested, an indication that such implantation favoured breech presentation. The implantation over the cornu altered the shape of the available uterine cavity. It reduced the fundal pole of the uterus to the same shape and capacity as the lower uterine pole. Since the foetal head is smaller than the breech, the head tends to accommodate itself to the smaller pole, but with implantation of the placenta in one cornu, the fundal pole might be the smaller, and thus the accommodating pole.

The increased frequency of left cornu implantation was, he considered, probably related to the commoner direction of rotation of the uterus - to the right. Such rotation brought the right side of the uterus against the unyielding structures of the posterior abdominal wall. Thus with the left side of the fundus reduced by the placental implantation, the foetal pole present in the right side of the fundus would tend to be held securely. Conversely with dextro-rotation of the uterus and implantation in the right cornu, the left half of the fundus would be in contact

TABLE 10

Effect of Placental Siting on the Lie and Presentation of the Foetus

Results in the present series for all presentations.

| Presentation | | Total Cases | Normal Anterior Placenta | Normal Posterior Placenta | Antero-Lateral Placenta | Lateral Placenta | Fundal Placenta | Fundal Cornual Placenta | Anterior Placenta Praevia | Posterior Placenta Praevia |
|---|---|---|---|---|---|---|---|---|---|---|
| Head | | 262 | 112 | 113 | 5 | 4 | 3 | 0 | 8 | 17 |
| Breech | Extended Legs | 64 | 13 | 9 | 1 | 0 | 8 | 33 | 0 | 0 |
| | Flexed Legs | 24 / 104 | 5 / 21 | 0 / 13 | 0 / 1 | 0 / 0 | 7 / 15 | 12 / 52 | 1 / 2 | 0 / 0 |
| | One leg flexed One leg extended | 14 | 3 | 4 | 0 | 0 | 0 | 7 | 1 | 0 |
| Transverse and Oblique lie. | | 51 | 22 | 6 | 1 | 0 | 10 | 0 | 7 | 5 |
| Total | | 417 | 155 | 132 | 7 | 4 | 28 | 52 | 17 | 22 |

with the relatively expansible anterior abdominal wall. Spontaneous version would thus occur more readily in right cornual implantation, since this would not hold the foetal pole present in the left half of the fundus so securely.

Persistent breech presentation would therefore be expected to show an increase of left over right cornual implantation, while increasing multiparity, because of the concomitant relaxation of the anterior abdominal wall, would decrease the incidence of breech presentation. Tomkins figures relating breech presentation to parity appear to confirm this.

Three anatomical studies of frozen sections illustrated in the literature, show cornual implantation in breech presentation, those of Waldeyer, Williams and Titus.

Table 10 shows the results obtained in the present series in tabulated form. The following tables detail these for each presentation.

Results in the Present Series.

(1). Head Presentation - 237 Cases.

Only those cases x-rayed from the 34th week onwards have been included. Where the dates were considered incorrect, maturity at the time of x-ray has been calculated from the estimated maturity at birth. Placenta praevia is not included.

TABLE 11.

| Placental Site | Number | Percentage |
|---|---|---|
| Anterior | 112 | 47 |
| Antero-lateral | 5 | 2 |
| Posterior | 113 | 47 |
| Postero-lateral | 0 | 0 |
| Lateral | 4 | 2 |
| Fundal | 3 | 1 |
| Fundal Cornual | 0 | 0 |

For head presentation therefore implantation of the placenta is almost entirely on the anterior or posterior wall of the uterus, and each site occurs with equal frequency.

(2). Breech Presentation - 102 cases.

Only those cases x-rayed from the 34th week upwards have been included. Where the dates were considered incorrect, maturity at the time of x-ray has been calculated from the estimated maturity at birth. Placenta praevia is not included.

TABLE 12

| Placental Site | All Breeches | Breeches with Extended Legs | Breeches with Flexed Legs | Breeches with one Leg Extended |
|---|---|---|---|---|
| Anterior | 21 = 21% | 13 | 5 | 3 |
| Antero-lateral | 1 = 1% | 1 | 0 | 0 |
| Posterior | 13 = 13% | 9 | 0 | 4 |
| Postero-lateral | 0 = 0% | 0 | 0 | 0 |
| Lateral | 0 = 0% | 0 | 0 | 0 |
| Fundal | 15 = 15% | 8 | 7 | 0 |
| Fundal Cornual | 52 = 52% | 33 | 12 | 7 |
| Total | 102 | 64 | 24 | 14 |

Of the 102 cases of breech presentation the subsequent history was as follows:-

| | |
|---|---|
| Spontaneous version and delivery as head . | 41 |
| External version and delivery as head . . | 12 |
| Breech delivery . . . . . | 36 |
| Caesarean section . . . . . | 5 |
| Subsequent history not known . . . . . | 8 |
| Total | 102 |

These figures may be broken down further.

(A). Breech with extended legs - 64 cases.

(1). Spontaneous version - 24 cases.

a. Fundal Cornual Placenta . 6 cases
b. Fundal Placenta . . . . 4 cases
c. Anterior Placenta . . . 7 cases
d. Posterior Placenta . . . 7 cases

(2). External Version - 10 cases.
- a. Fundal Cornual Placenta . 6 cases
- b. Fundal Placenta . . . 2 cases
- c. Anterior Placenta . . . 1 case
- d. Posterior Placenta . . 1 case

(3). Breech Delivery - 24 cases.
- a. Fundal Cornual Placenta . 19 cases
- b. Fundal Placenta . . . 2 cases
- c. Anterior Placenta . . . 3 cases
- d. Posterior Placenta . . 1 case

(4). Caesarean section - 1 case.
A Fundal Cornual Placenta.

(5). Subsequent history not known . 5 cases

(B). Breech with flexed legs - 24 cases.

(1). Spontaneous version - 11 cases.
- a. Fundal Cornual Placenta . 2 cases
- b. Fundal Placenta . . . 5 cases
- c. Anterior Placenta . . . 4 cases

(2). External version - 1 case.
Fundal Cornual Placenta.

(3). Breech delivery - 8 cases.
- a. Fundal Cornual Placenta . 7 cases
- b. Fundal Placenta . . . 1 case

(4). Caesarean section - 3 cases.
- a. Fundal Cornual Placenta . 2 cases
- b. Fundal Placenta . . . 1 case

(5). Subsequent history not known . 1 case

(C). Breech with one leg extended - 14 cases.

(1). Spontaneous version - 5 cases.
- a. Anterior Placenta . . . 3 cases
- b. Posterior Placenta . . 2 cases

(2). External version - 1 case.
A Fundal Cornual Placenta .

(3). Breech delivery - 4 cases.
- a. Fundal Cornual Placenta . 3 cases
- b. Posterior Placenta . . 1 case

(4). Caesarean section - 1 case.
A Fundal Cornual Placenta.

(5). Subsequent history not known . 2 cases

In general these results like those of Stevenson in 1949 and 1951 show an increased incidence of fundal and particularly fundal cornual implantation of the placenta in

breech presentations, although not in so high a percentage as found by Stevenson.

It has been found that spontaneous version from a breech presentation does occur when the placenta is covering one or other cornu, and that persistent breech presentation does occur when the placenta is implanted on the anterior or posterior wall of the uterus. Two cases of placenta praevia also were found amongst the breech presentations.

It is felt that at present the various figures are too small to be statistically significant, but in view of the potential importance of these findings, if substantiated, a further investigation into this problem is proceeding.

(3). Transverse lie - 39 cases.

Only those cases x-rayed from the 34th week onwards have been included. Where the dates were considered incorrect, maturity at the time of x-ray has been calculated from the estimated maturity at birth. Placenta praevia is not included.

TABLE 13

| Placental Site | Number | Percentage |
|---|---|---|
| Anterior | 22 | 56 |
| Antero-lateral | 1 | 3 |
| Posterior | 6 | 15 |
| Postero-lateral | 0 | 0 |
| Lateral | 0 | 0 |
| Fundal | 10 | 26 |
| Fundal Cornual | 0 | 0 |

Of the 39 cases of transverse lie, eight persisted as such until the onset of labour or Caesarean section. Five cases were treated by Caesarean section, and three cases had an external version performed during labour with subsequent vaginal delivery. Spontaneous version to breech presentation occurred in two cases, one of which was delivered as a breech, and the other was delivered by Caesarean section. The remaining 29 cases became stabilized before or at the onset of labour as head presentations, and were delivered vaginally as such.

In transverse lie, therefore, there is a high incidence of fundal and anterior implantation of the placenta. The association of placenta praevia with transverse and oblique lie was shown above, 12 cases of placenta praevia being found in 51 cases of transverse or oblique lie.

The following conclusions are drawn from the present series on the effect of the placental site on the lie and presentation of the foetus.

1). In head presentations, the distribution of the placental site is almost equally divided between anterior and posterior uterine walls. Only a very small number of cases show lateral or fundal implantation.

2). In breech presentation there is a marked change in the distribution of the placental site. There is a considerable increase in the number of implantations of the placenta in the fundal region. This is especially so where one or other cornu of the uterus is covered.

3). Transverse or oblique lie is shown to be commonly associated with implantation of the placenta in the lower uterine segment or fundus. Anterior implantation is more than three times as common as posterior implantation in transverse or oblique lie.

## CHAPTER 10

## SUMMARY

1). The location of the placental site by radiological methods is described, and the relevant literature critically reviewed.

2). A simple technique for location of the placental site by soft tissue radiography is described.

3). The results obtained by this technique in 424 pregnant women are detailed.

4). The technique has proved extremely reliable in the exclusion of placenta praevia. Three hundred and seventy-six cases of this type are presented with no known error.

5). The method has proved to be reliable in the positive diagnosis of placenta praevia. Of 45 cases showing radiological evidence of placenta praevia, the diagnosis was confirmed clinically in 38.

6). The high incidence of placenta praevia and fundal placentation in transverse and oblique lies is noted.

7). There were 12 cases in which the diagnosis of placenta praevia presumed on clinical grounds was confirmed radiologically before any antepartum haemorrhage occurred.

8). The effect of the placental site on the lie and presentation of the foetus is discussed. In head presentations the location of the placenta has been found to be mainly

anterior or posterior; in transverse lie mainly anterior, fundal or in the lower uterine segment; while in breech presentations there is a high incidence of "fundal cornual" placentae.

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